CALIFORNIA HIGH-SPEED TRAIN

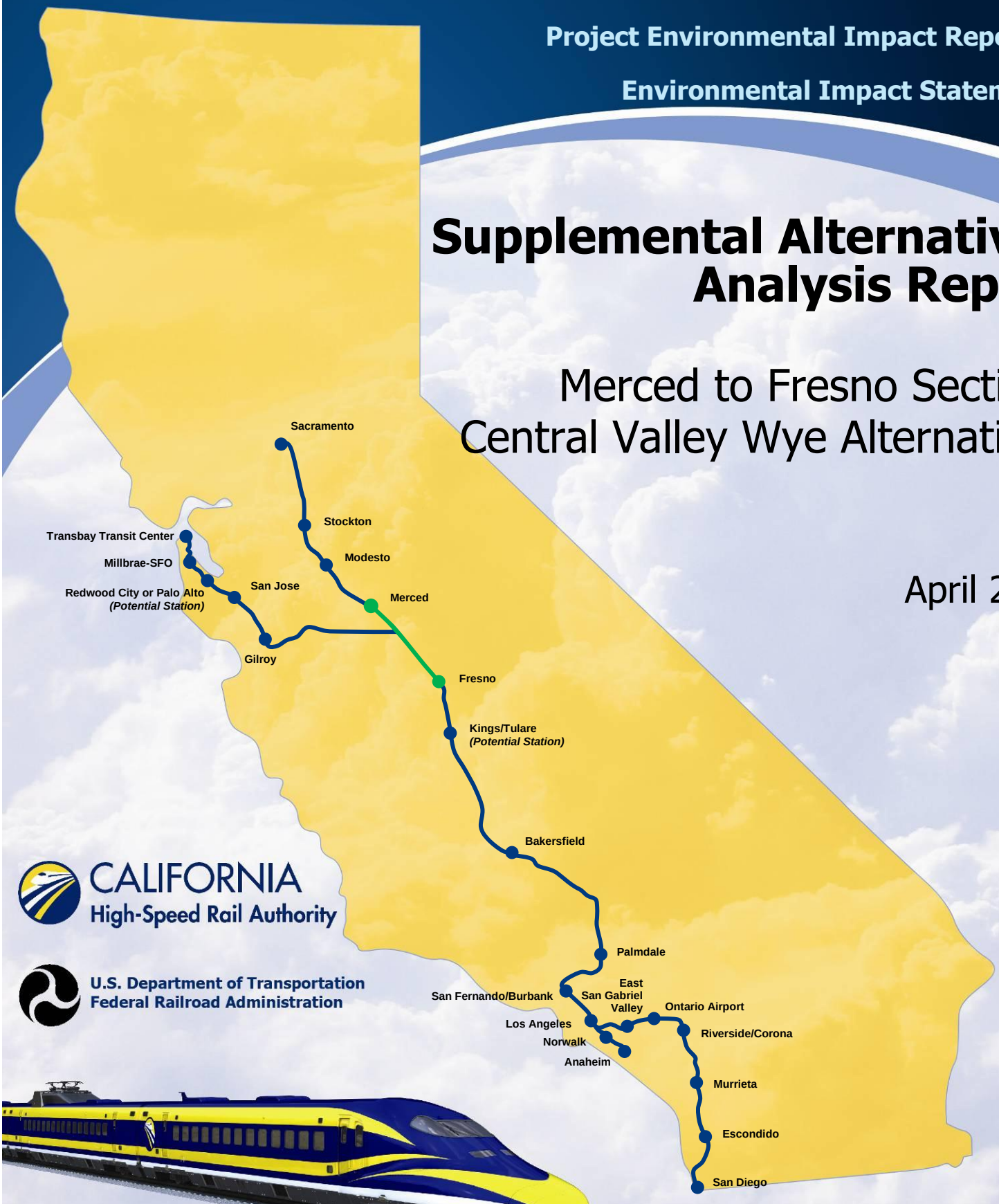
Project Environmental Impact Report /

Environmental Impact Statement

Supplemental Alternatives Analysis Report

Merced to Fresno Section: Central Valley Wye Alternatives

April 2013



CALIFORNIA High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

California High-Speed Train Project

Merced to Fresno Section: Central Valley Wye Alternatives

SUPPLEMENTAL ALTERNATIVES ANALYSIS REPORT

April 2013

TABLE OF CONTENTS

Appendices

Tables

Figures

Acronyms and Abbreviations

AA	Alternatives Analysis
Authority	California High-Speed Rail Authority
BNSF	Burlington Northern Santa Fe
CEQA	California Environmental Quality Act
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FRA	Federal Railroad Administration
GEA	Grasslands Ecological Area
HST	High-Speed Train
I	Interstate
LEDPA	Least Environmentally Damaging Practicable Alternative
NEPA	National Environmental Policy Act
SAA	Supplemental Alternatives Analysis
SEIR	Subsequent EIR
SEIS	Supplemental EIS
SR	State Route
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
Wye	Central Valley Wye

ES.0 Executive Summary

This April 2013 Merced to Fresno Section: Central Valley Wye Alternatives Supplemental Alternatives Analysis (SAA) Report updates the April 2010 Preliminary AA Report and the August 2010 and May 2011 SAA Reports that the California High-Speed Rail Authority (Authority) issued for the Merced to Fresno High-Speed Train (HST) Section and the July 2011 SAA Report for the San Jose to Merced Section focused on the Wye area and State Route (SR) 152.

The SAA evaluates Central Valley wye alternatives and recommends alternatives to be carried forward for environmental review in the Merced to Fresno Section: Wye Alternatives Subsequent Environmental Impact Report/Supplemental Environmental Impact Statement (SEIR/SEIS), consistent with requirements under the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), and Clean Water Act section 404.

ES.1 Evaluation of Wye Alternatives

A total of 14 wye alternatives that extend eastward from Carlucci Road along Henry Miller Road are evaluated in this document. The Henry Miller Road study corridor was identified in the *2008 Bay Area to Central Valley Final Program EIR/EIS* and *2012 Partially Revised Final Program EIR* as part of the "Caltrain/Pacheco/Henry Miller Avenue" alignment selected for further study in second-tier environmental documents. Since this alignment was first introduced, several east-west alternatives and variations to those alternatives have been identified; all generally follow Henry Miller Road and then diverge at Avenue 24, State Route (SR) 152, or Avenue 21. North-south connection options were also considered for these alignments as they traverse the area in the vicinity of Chowchilla. These connections generally follow Road 11, Road 12, Road 13, SR 99, Road 18, or Road 19. Intermixing the east-west and north-south variations has resulted in a number of potential alignments. The 14 wye alternatives evaluated in this SAA are listed below.

- Avenue 24 to Road 11 Wye Alternative
- Avenue 24 to East of Road 12 Wye Alternative
- Avenue 24 to Road 13 Wye Alternative
- SR 152 (North) to Road 11 Wye Alternative
- SR 152 (North) to Road 13 Wye Alternative
- SR 152 (North) to Road 18 Wye Alternative
- SR 152 (North) to Road 19 Wye Alternative
- SR 152 (South) to Road 18 Wye Alternative
- SR 152 (South) to Avenue 21 to SR 99 Wye Alternative
- SR 152 (South) to Avenue 21 to Road 19 Wye Alternative
- Avenue 21 to Road 11 Wye Alternative
- Avenue 21 to Road 13 Wye Alternative
- Avenue 21 to SR 99 Wye Alternative
- Avenue 21 to Road 19 Wye Alternative

Three other wye alternatives were previously considered and withdrawn from further consideration prior to this SAA for reasons of environmental impacts, cost, and inconsistency with Proposition 1A. The three previously withdrawn alternatives are the SR 140 Wye Alternative, Avenue 22 Wye Alternative, and South of GEA Wye Alternative. The evaluation process and alignment descriptions for the three previously considered and withdrawn wye alternatives are included in Appendix A.

ES.2 Plans for Additional Consideration of Heavy Maintenance Facility Site Alternatives in Wye Area

The Authority is still in the process of evaluating the heavy maintenance facility (HMF) alternatives identified in the Merced to Fresno Section Final EIR/EIS to determine which remain reasonable for further consideration. Of the five HMF alternatives studied in the Merced to Fresno Section Final EIR/EIS, one is outside the Wye study area (Castle Commerce Center) and four are within the Wye area (Harris DeJager, Kojima, Fagundes, and Gordon Shaw). Of the four in the Wye area, Harris DeJager has been withdrawn from consideration by the proponent and staff is evaluating the other three.

The Castle Commerce Center site is still under consideration, but outside the area of this analysis. Any of the remaining three sites within the Wye area that meet the HMF siting criteria in light of the prior selection of the Hybrid north/south alignment, and which have no fatal flaws from an engineering, planning, and environmental perspective will be studied in the SEIR/SEIS. Selection of a final HMF location is not expected until sometime in 2016.

ES.3 Evaluation Criteria Used

Each wye alternative was evaluated based on a variety of criteria that include ability to meet project purpose and need/most project objectives, environmental impacts, and considerations of feasibility under NEPA and CEQA and practicability under Clean Water Act section 404 to determine which alternatives would be eliminated and which would be carried forward. Those carried forward would receive more detailed engineering design and more detailed environmental review in the SEIR/SEIS. An alternative may be eliminated from detailed study if it is not practicable under Clean Water Act section 404 and not even potentially feasible under NEPA and CEQA. An alternative may also be eliminated from further study if it offers no substantial environmental advantage over alternatives recommended for study, particularly in the area of impacts to waters of the United States.

The 14 wye alternatives considered in this SAA were evaluated based on criteria that include, but are not limited to, the criteria and examples listed below:

- Design objectives (such as travel time and cost)
- Land use (such as consistency with land use and general plans)
- Constructability (such as track type construction and access to the corridor)
- Community impacts (including number of residential and business relocation impacts)

- Natural resources (such as impacts on wetlands, potential threatened and endangered species habitat, cultural resources, Important Farmlands, and parks and recreational resources)
- Environmental quality (such as number of sensitive noise receptors)
- Additional considerations (such as ability to meet project purpose and support by public and agencies)

The listed screening criteria that most greatly affected the decision to eliminate or carry forward an alternative are listed below:

- Aquatic impacts – wetlands, vernal pools, etc.
- Environmental impacts - non-aquatic
- Practicability considerations -
  - Meeting the project purpose and need and design objectives
  - Feasibility of construction, considering logistics, cost and current technology
  - Compatibility with land use plans and local community integrity
  - Right-of-way acquisition issues and opportunities, used to determine whether an alternative could be constructed and at what cost in acquiring real estate

ES.4 Rationale for Carried Forward Wye Alternatives

Following an evaluation of the 14 wye alternatives, it is recommended that 10 of the alternatives be withdrawn from further analysis and that the remaining four be carried forward for detailed evaluation in the Merced to Fresno Section: Wye Alternatives SEIR/SEIS. These wye alternatives have been determined to be potentially practicable and feasible, to fulfill the project's purpose and need and most project objectives, and to minimize environmental impacts. The rationale for carrying forward the four wye alternatives is described below. Table ES-1 presents a summary of the evaluation data included in Appendix B: Wye Alternatives Evaluation Summary. The following Wye Alternatives are recommended for further study in the Wye Alternatives SEIR/SEIS:

SR 152 (North) to Road 13 Wye Alternative: The SR 152 (North) to Road 13 Wye Alternative would have the least impact to aquatic and agricultural resources among all the wye alternatives.

SR 152 (North) to Road 18 Wye Alternative: The SR 152 (North) to Road 18 Wye Alternative would result in the second least impact to aquatic resources among the SR 152 (North) wye alternatives and the fourth least impact to aquatic resources among all the wye alternatives. Further, an SR 152 (North) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies.

SR 152 (South) to Road 18 Wye Alternative: The SR 152 (South) to Road 18 Wye Alternative would have the second least impact to aquatic resources among all wye alternatives. Further, a SR 152 (South) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies.

Avenue 21 to Road 13 Wye Alternative: The Avenue 21 to Road 13 Wye Alternative would have the third least impact to aquatic resources among all wye alternatives.

Table ES-1: Merced to Fresno Section Wye Alternatives Carried Forward Evaluation Summary

	SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 18 Wye	SR 152 (South) to Road 18 Wye	Avenue 21 to Road 13 Wye
Aquatic Resources (Acres) - Wetland Habitat, Vernal Pool Complex, Lakes/Ponds/Rivers, Reservoir, Swamp/Marshes	118.1	121.5	118.7	119.2
- Streams, Creeks, or Canals (Miles)	20.0	24.9	21.6	22.3
Biological Resources (Acres) San Joaquin Kit Fox, California Tiger Salamander, California Red-legged Frog, Vernal Pool Tadpole Shrimp, Vernal Pool Fairy Shrimp	5,607	6,253	6,197	5,535
Agricultural Lands (Acres of Important Farmland) Farmland of Local Importance, Prime Farmland, Unique Farmland, Farmland of Statewide Importance	2,514	2,834	3,231	2,823
Williamson Act Farmland (Acres)	1,204	1,123	1,286	1,192
Noise/Vibration (Number of Potentially Impacted Receptors Before Mitigation)	1,321/269	888/207	1,034/100	1,279/232
Grade Separations	21	22	20	23
Number of Schools within 1,500 feet	1	1	1 – School Relocation	2
Residential and Business Relocations	142-163 Residences 5-10 Businesses	137-160 Residences 7-15 Businesses	132-155 Residences 9-16 Businesses	128-142 Residences 2-3 Businesses
Capital Costs M-F Wye Leg – Ranch Road to Avenue 17 (Millions)[1]	$1,010.2	$1,137.6	$1,142.9	$1,043.0
Capital Costs (Millions)[2]	$6,250	$6,723	$6,840	$5,836

[1]This cost includes only the north-south portion of the wye from Ranch Road to Avenue 17. Therefore it does not reflect the cost of the complete wyes, but only the portions necessary to travel between Merced and Fresno.

[2]This is the capital cost to build all three legs of the wye, from the endpoints of Carlucci Road, to Ranch Road, to Avenue 17.

ES.5 Recommendations

It is recommended that four (4) alignment and wye configurations shown on Figure ES-1 be carried forward and evaluated in the Merced to Fresno Section: Wye Alternatives SEIR/SEIS. The SAA recommendations are summarized in Table ES-2: Merced to Fresno Section Wye Alternatives Considered.

This recommendation is subject to the regulatory review and concurrence by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, pursuant to the NEPA/Clean Water Action Section 404 Integration Memorandum of Understanding. Staff will report back to the Board if these agencies' views differ from this recommendation.

Table ES-2: Merced to Fresno Section Wye Alternatives Considered

WYE ALTERNATIVES	DECISION		REASONS FOR ELIMINATION*							ENVIRONMENTAL/OTHER CONCERNS
	Carried Forward	Withdrawn	Construction/Cost	Incompatibility	Right-of-way	Connectivity/ Accessibility	Revenue/Ridership	Traffic Circulation/ Road Closures	Environment	
Avenue 24 to Road 11 Wye		X		S					P	Aquatic resources; Agricultural resources; Opposition from City of Chowchilla and rural farm interests
Avenue 24 to East of Road 12 Wye		X		S					P	Aquatic resources; Agricultural resources; Opposition from City of Chowchilla and rural farm interests
Avenue 24 to Road 13 Wye		X		S				S	P	Aquatic resources; Agricultural resources; Circulation impacts due to number of road closures; Opposition from City of Chowchilla and rural farm interests
SR 152 (North) to Road 11 Wye		X							P	Aquatic resources; Agricultural resources; Biological resources; Noise impacts
SR 152 (North) to Road 13 Wye	X									Noise impacts
SR 152 (North) to Road 18 Wye	X									Capital cost; Cultural resources
SR 152 (North) to Road 19 Wye		X							P	Aquatic resources; Agricultural resources; Journey time
SR 152 (South) to Road 18 Wye	X									Fairmead Elementary School relocation; Agricultural resources
SR 152 (South) to Avenue 21 to SR 99 Wye		X	S						P	Aquatic resources; Agricultural resources; High capital costs; Journey time
SR 152 (South) to Avenue 21 to Road 19 Wye		X							P	Aquatic resources; Agricultural resources; Journey time
Avenue 21 to Road 11 Wye		X						S	P	Aquatic resources; Agricultural resources; Biological resources; Circulation impacts due to number of road closures

Table ES-2: Merced to Fresno Section Wye Alternatives Considered

WYE ALTERNATIVES	DECISION		REASONS FOR ELIMINATION*							ENVIRONMENTAL/OTHER CONCERNS
	Carried Forward	Withdrawn	Construction/Cost	Incompatibility	Right-of-way	Connectivity/ Accessibility	Revenue/Ridership	Traffic Circulation/ Road Closures	Environment	
Avenue 21 to Road 13 Wye	X									Circulation impacts due to number of road closures
Avenue 21 to SR 99 Wye		X	P					S		High capital costs; Circulation impacts due to number of road closures
Avenue 21 to Road 19 Wye		X						S	P	Aquatic resources; Agricultural resources; Biological resources; Journey time; Circulation impacts due to number of road closures

Notes: * Primary (P) and secondary (S) reasons for elimination.

Figure ES-1
Merced to Fresno Section: Wye Alternatives Carried Forward

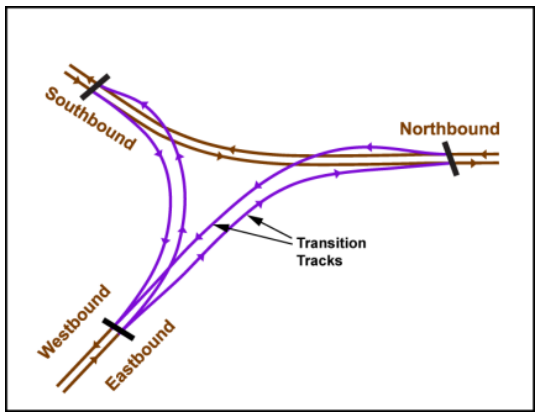
1.0 Introduction/Background

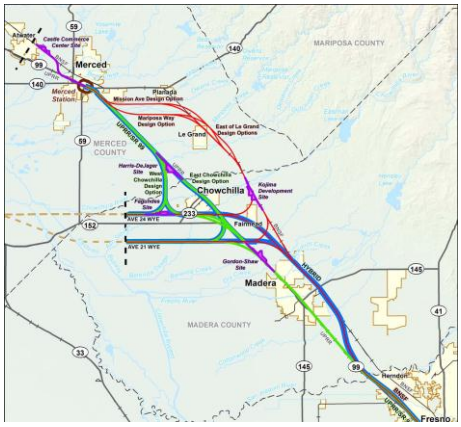
This April 2013 Merced to Fresno Section: Central Valley Wye Alternatives Supplemental Alternatives Analysis (SAA) Report updates the April 2010 Preliminary AA Report and the August 2010 and May 2011 SAA Reports that the California High-Speed Rail Authority (Authority) issued for the Merced to Fresno High-Speed Train (HST) Section and the July 2011 SAA Report for the San Jose to Merced Section focused on the Wye area and State Route (SR) 152.

The SAA evaluates Central Valley wye alternatives and recommends alternatives to be carried forward for environmental review in the Merced to Fresno Section: Wye Alternatives Subsequent Environmental Impact Report/Supplemental Environmental Impact Statement (SEIR/SEIS) consistent with requirements under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

1.1 Central Valley Wye

The Central Valley Wye (Wye) is a connection where train tracks (guideways) branch off from a main line to continue in different directions, forming a "Y"-like shape. In this case, the two tracks traveling east-west must become four tracks: a set of two tracks branching northbound and a set of two tracks branching southbound.





The California High-Speed Train Central Valley Wye is located near Chowchilla and will serve as the junction for the system to head west to San Francisco (connecting with the San Jose to Merced Section), north to Sacramento (connecting with the Merced to Sacramento Section), south to Fresno and on to Los Angeles (connecting to the Merced to Fresno Section and other southern sections). The wye will cover about 12 square miles and will have tracks running in three directions.

1.1.1 Background – Initial Study of Wye Options in Merced to Fresno Section

The Central Valley Wye was included in and analyzed initially as part of the Merced to Fresno Section. The Merced to Fresno Section EIR/EIS process commenced in 2009 and continued

through scoping which included public discussions about the range of alternatives in 2010 and 2011. Wye options were considered in the Preliminary Alternatives Analysis Report in April 2010 and SAA Reports in August 2010 and May 2011.[1] As a result of the public scoping and alternatives analysis process, the Draft EIR/EIS, released in August 2011, includes detailed examinations of east-west alignments and Wyes at Avenue 21 and Avenue 24 in Madera County and in proximity to the City of Chowchilla.

Based on stakeholder and regulatory agency input, the Authority had also determined that a SR 152 east-west alignment and Wye merited detailed study as well, and that this study would occur through the adjoining San Jose to Merced Section EIR/EIS process.[2] Accordingly, the Merced to Fresno Draft EIR/EIS explained that all three east-west alignments and Wyes (Avenue 21, Avenue 24, and SR 152) would be carried forward for further study as part of the San Jose to Merced Section, and the Merced to Fresno Section EIR/EIS would be used to support only a north-south route decision. All three east-west alignments and Wyes would work with the three north-south alignments the Authority Board of Directors (Authority Board) was considering at the time for the Merced to Fresno Section (UPRR, BNSF, and Hybrid).[3]

1.1.2 Work Advanced as Part of San Jose to Merced Section

At the Authority Board's May 2012 meeting, when it selected the Hybrid Alternative as the north-south alignment for the Merced to Fresno Section, the Authority Board directed staff to "carry forward for further study and analysis all high-speed rail elements in the Wye area" (i.e., the "Box"). Such analysis was to determine whether any of the current Wye alternatives 'should be changed, augmented, or eliminated, or additional Wye alternatives considered. Staff was to return to the Authority Board with recommendations, including coverage, in further CEQA documentation by July 31, 2012."[4]

Prior to the May 2012 direction from the Board, Authority staff, the San Jose to Merced Project team, and the Merced to Fresno Project team had already worked closely with interested stakeholders to understand their concerns about the Central Valley Wye. Following May 2012, staff engaged in further outreach and discussions with stakeholders to focus on and seek ways to refine the Wye options connecting the recently selected Hybrid north-south alignment for the Merced to Fresno Section to the San Jose to Merced Section.

---

[1] See Authority CEO Report PowerPoint Presentation, June 2011, posted on the Authority website at: http://www.cahighspeedrail.ca.gov/lib_Merced_Fresno.aspx.

[2] See July 2011 San Jose to Merced PowerPoint Presentation, posted on the Authority's website at: http://www.cahighspeedrail.ca.gov/Lib_San_Jose_Merced.aspx.

[3] See July 2011 San Jose to Merced PowerPoint Presentation; July 2011 Merced to Fresno Board Book Memo, posted on the Authority's website (see Footnote #2 link above)

[4] See Resolution # HSRA 12-20, posted on the Authority's website at: http://www.cahighspeedrail.ca.gov/final-eir-m-f.aspx.

Having common endpoints[5] to work from, the Central Valley Wye discussions generated multiple conceptual alignment ideas focused on addressing stakeholder concerns. Staff also worked closely with Caltrans and Madera County to refine the approach to an SR 152 Wye. The range of potential alternatives under discussion expanded to 14 in order to evaluate the viability of several new scenarios generated through stakeholder input and agency discussions. Authority staff reported its progress to the Authority Board in August 2012, and identified at that time that the best procedural approach for addressing the Wye was still keeping it as part of the San Jose to Merced EIR/EIS.[6]

1.1.3 Transition of Central Valley Wye back to Merced to Fresno Section

In late 2012, Authority staff recognized an opportunity to possibly extend early construction in the Central Valley further north than originally anticipated. To maximize the agency's flexibility in this regard, selection of the Central Valley Wye was identified as a high priority. To accomplish this objective, in January 2013 staff described to the Authority Board a strategy to focus work on the Central Valley Wye and to conduct the necessary environmental review as a follow-on to the Merced to Fresno EIR/EIS. This approach will result in what is called a Subsequent EIR and Supplemental EIS (SEIR/SEIS) for the Merced to Fresno Section, and it is anticipated that this document can proceed more quickly than a full San Jose to Merced Section EIR/EIS while still providing a full and thorough analysis of the Wye Alternatives.

1.1.4 Next Steps toward Selection of Central Valley Wye Alternative

Over the last two years, Authority staff and the San Jose to Merced Project team have worked with Central Valley stakeholders and agencies to identify a range of alignment alternatives to examine more closely as part of the SAA process. At the January 2013 Board meeting, Authority staff provided an informational update based on data gathered for the SAA and input received from local and regional stakeholders and identified six potentially feasible and reasonable alternatives that appeared to address the most consistent concerns identified by stakeholders as well as the requirements of NEPA, CEQA, and Clean Water Act section 404. Since the January Board briefing, the Authority has continued working with stakeholders to identify ways to optimize the east-west wye alternatives to connect with the selected north-south Hybrid alignment. Based on this ongoing stakeholder engagement, public feedback, input from the regulatory agencies, and further evaluation of the alternatives, Authority staff has narrowed the recommended range of alternatives down to four: three of the six alternatives presented in January 2013, and one alternative from the original 14, which has been reintroduced. The Authority hosted Community Meetings in Fairmead (March 20) and Chowchilla (March 27) to share these findings and gather additional public and stakeholder input. This SAA reports the results of this public engagement to the Board and recommends the alternatives to be carried forward into the SEIR/SEIS.

[5] The common endpoints are Carlucci Road (on the west), Ranch Road (on the north), and Avenue 17 (on the south).

[6] See San Jose to Merced Section Update Presentation, August 2012, posted on the Authority's website (see Footnote #2 link above).

The Authority and the Federal Railroad Administration (FRA) will submit the four Wye alternatives described in this SAA to the U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) for their review and concurrence pursuant to the agencies Memorandum of Understanding to integrate NEPA and Clean Water Act section 404. Staff will report back to the Board at a future meeting on the input received from the regulatory agencies on the range of alternatives.

1.2 Heavy Maintenance Facility

One Heavy Maintenance Facility (HMF) site will be required for operation of the entire HST System. The HMF, to be located within the Central Valley, would serve two functions: (1) support train arrival, assembly, testing, and commissioning to operations and (2) become the state's system-wide heavy maintenance workshop. (Merced to Fresno Section Final EIR/EIS, § 2.2.9.2.) In 2009, the Authority issued a request for expressions of interest (RFEI) from communities and other interested parties for potential HMF locations that could meet the Authority's siting needs, minimize environmental impacts, and offer benefits to the community and the State.[7] Based on responses to the RFEI, and further screening of the proposed sites during the alternatives analysis and Clean Water Act "Checkpoint B" processes for the Merced to Fresno and Fresno to Bakersfield sections, the Authority and FRA evaluated ten HMF site alternatives: five in the Merced to Fresno Section Final EIR/EIS, and five in the Fresno to Bakersfield Section Revised Draft EIR/Supplemental Draft EIS. The HMF site alternatives evaluated in each environmental document represent reasonable options for the different north-south alignment alternatives studied.

1.2.1 Decision Making Process for HMF Site

Because only one HMF site will be required for full HST operations, FRA and the Authority have not yet selected an HMF site. These agencies anticipate selecting the HMF site after completing the Fresno to Bakersfield Section Final EIR/EIS process and the Merced to Fresno Section: Wye Alternatives SEIR/SEIS.[8] These agencies may choose to engage in further environmental, economic, or engineering analysis of one or more of the leading HMF site alternatives prior to making a final decision.

Of the five HMF site alternatives in the Merced to Fresno Section, four are located within the study area for the wye alternatives (see Figure 1-1). The Castle Commerce Center HMF site is outside the study area for the wye alternatives. Although the Authority and FRA have determined that it merits continued consideration in light of their selection of the Hybrid Alternative as the preferred alternative for the Merced to Fresno Section, it will not be discussed further in this document, which is focused on the wye alternatives. The Castle Commerce Center HMF site alternative has been evaluated in the Merced to Fresno Final EIR/EIS.

[7] See Memorandum from M. Morshed to Chairman Pringle and Authority Members re: Agenda Item 7 – Request for Expressions of Interest for Maintenance Facilities, Oct. 30, 2009.

[8] Record of Decision, § 4.3.3; Authority Resolution HSRA # 12-20.

The proposed Harris-De Jager HMF site alternative was also evaluated in the Merced to Fresno Section Final EIR/EIS. The Authority received communication from the site sponsor that it was withdrawing all De Jager properties from consideration, including this site (Kopshever 2011). This site is no longer practicable from a Clean Water Act section 404 perspective and therefore no longer reasonable from a NEPA and CEQA perspective because the landowner is no longer a willing participant to host the HMF site. Therefore, the Harris-De Jager site alternative will not be considered further.

Staff are continuing to assess the Kojima, Gordon-Shaw, and Fagundes HMF sites and will report back to the Board with the conclusion of its findings and recommendations.

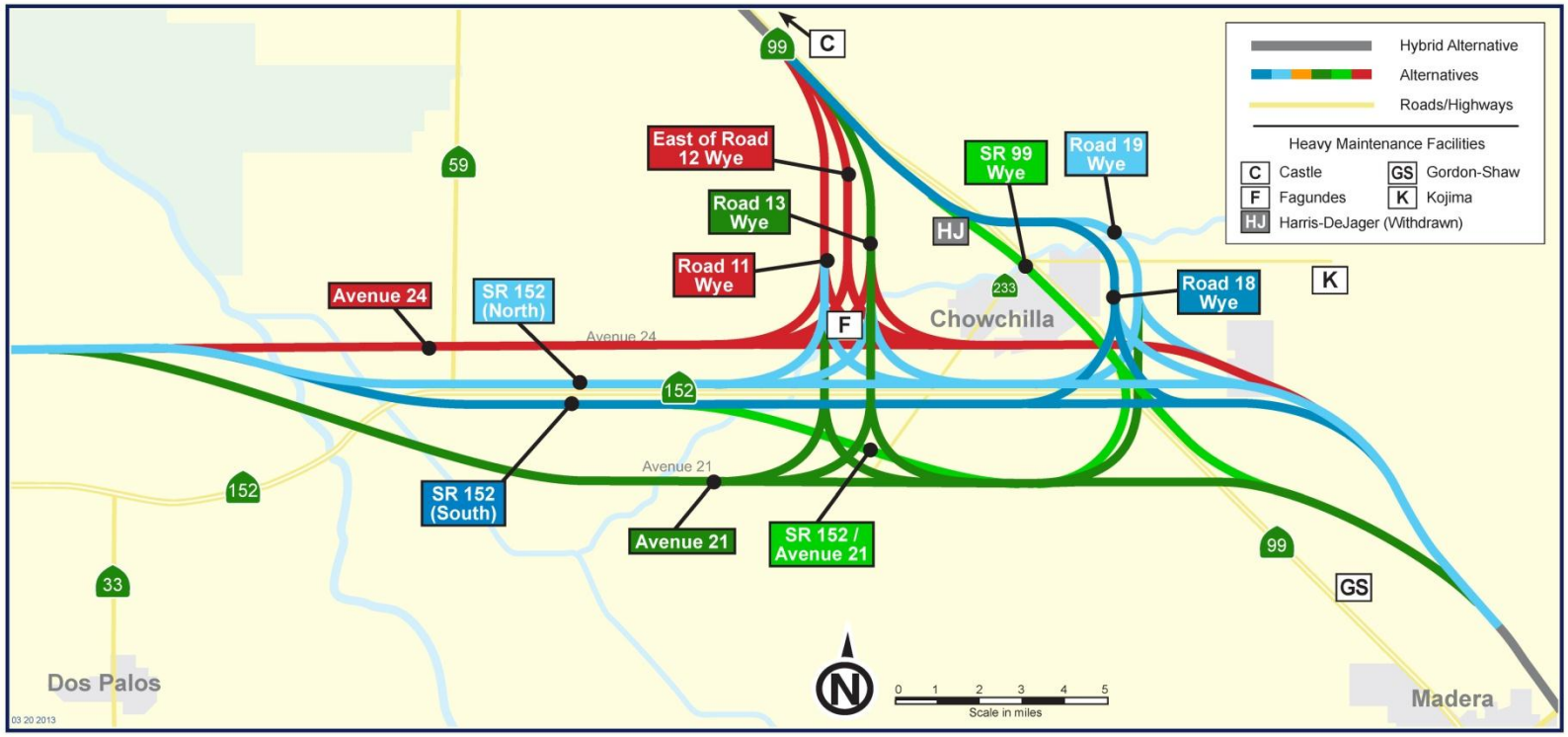


Figure 1-1
Heavy Maintenance Facility Site Alternatives Within the Wye Area

2.0 Description of Wye Alternatives

2.1 Study Area

The wye alternatives are located between the intersection of Henry Miller Road and Carlucci Road in western Merced County and the Merced to Fresno Section Hybrid Alternative at approximately SR 99 in Merced and Madera counties (see Figures 2-1 through 2-5).

The study area for the wye alternatives was defined based on a conservative footprint that incorporates all features of the project with the potential for impacts to environmental resources, as shown in the current conceptual-level engineering. The widths of the footprints for this alternatives screening analysis typically range from approximately 120 to 350 feet.

A total of 14 wye alternatives that extend eastward from Carlucci Road along Henry Miller Road are evaluated in this document. The Henry Miller Road study corridor was identified in the *2008 Bay Area to Central Valley Program Final EIR/EIS* and *2012 Partially Revised Final Program EIR* as part of the "Caltrain/Pacheco/Henry Miller Avenue" alignment selected for further study in second-tier environmental documents. Since this alignment was selected, several east-west alternatives and variations to those alternatives have been identified; all generally follow Henry Miller Road and then diverge at Avenue 24, SR 152, or Avenue 21. North-south connection options were also considered for these alignments as they traverse the area in the vicinity of Chowchilla. These connections generally follow Road 11, Road 12, Road 13, SR 99, Road 18, or Road 19. Intermixing the east-west and north-south variations has resulted in a number of potential alignments.

Three other wye alternatives were previously considered and withdrawn from further consideration prior to this SAA for reasons of environmental impacts, cost, and inconsistency with Proposition 1A. The three previously withdrawn alternatives are the SR 140 Wye Alternative, Avenue 22 Wye Alternative, and South of GEA Wye Alternative. The evaluation process and alignment descriptions for the three previously considered and withdrawn wye alternatives are included in Appendix A. The wye alternatives considered in this document are described below from north to south. A brief background of each alternative is included with the description.

2.1.1 Avenue 24 to Road 11 Wye Alternative

The Avenue 24 to Road 11 Wye Alternative would begin at Carlucci Road and extend eastward along Henry Miller Road and Jefferson Road/Avenue 24 (see Figure 2-1). This alternative would be at-grade along the south side of Henry Miller Road, crossing various sloughs and drains parallel to the San Joaquin River. After crossing the main channel of the San Joaquin River, this alternative would run just to the south of Jefferson Road, which becomes Avenue 24 upon crossing into Madera County. It would continue along the south side of Avenue 24 to about Road 9, west of Chowchilla. Here, the San Jose to Merced leg of the wye would curve northward to Road 11, then continue north to connect to the Hybrid Alternative, ending at Ranch Road. The San Jose to Fresno leg of the wye would continue eastward along Avenue 24, cross the UPRR/SR 99 corridor, then curve south to meet the Hybrid Alternative and continue to Avenue 17 in Madera Acres, where the alternative would end. The Merced to Fresno leg of this wye would provide the easterly connection between the Avenue 24 and Road 11 segments of the alternative.

2.1.2 Avenue 24 to East of Road 12 Wye Alternative

The Avenue 24 to East of Road 12 Wye Alternative would essentially be the same as the Avenue 24 to Road 11 Wye Alternative, except the San Jose to Merced leg of the wye would extend east of Road 12 rather than along Road 11 to reach the Hybrid Alternative along the UPRR/SR 99 corridor. The Merced to Fresno leg of this wye would provide the easterly connection between the Avenue 24 and Road 12 segments of this alternative (see Figure 2-1).

2.1.3 Avenue 24 to Road 13 Wye Alternative

The Avenue 24 to Road 13 Wye Alternative would essentially be the same as the Avenue 24 to Road 11 Wye Alternative, except the San Jose to Merced leg of the wye would curve north to follow Road 13 rather than Road 11 to connect to the Hybrid Alternative along the UPRR/SR 99 corridor. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 24 and Road 13 segments of this alternative (see Figure 2-1).

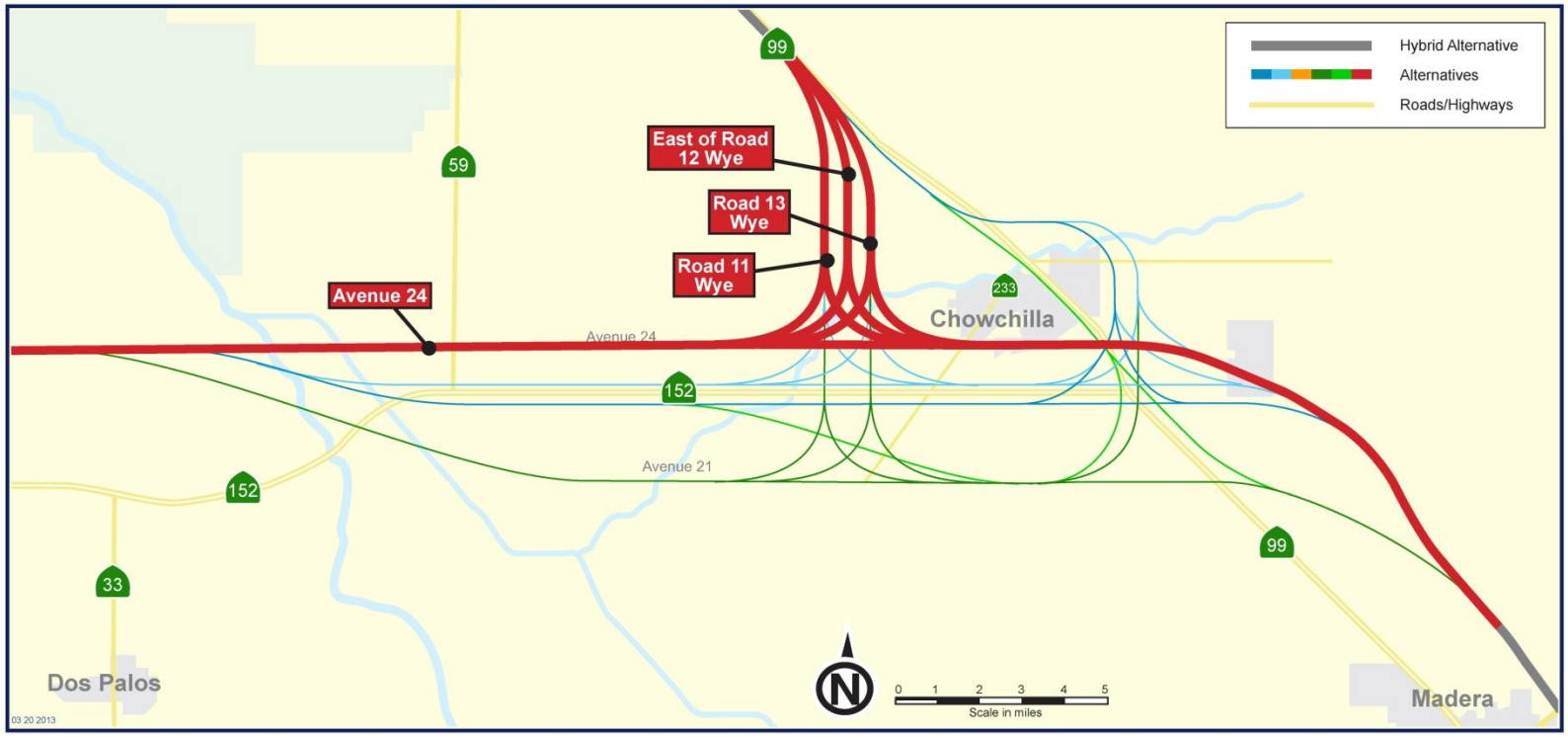


Figure 2-1
Avenue 24 Wye Alternatives

2.1.4 SR 152 (North) to Road 11 Wye Alternative

The SR 152 (North) to Road 11 Wye Alternative would begin at Carlucci Road, extend east along Henry Miller Road, then turn south to run on a diagonal path toward the San Joaquin River. On its approach to the San Joaquin River and Eastside Bypass (flood control channel), it would ascend gently to an aerial structure to cross the two watercourses. While crossing the two watercourses, the alternative would turn east near the SR 152/SR 59 interchange and then run parallel to SR 152, running on a tall embankment between the watercourses and the highway, about 85 feet north of the roadway.

West of Chowchilla, the San Jose to Merced leg of this wye would curve north and run along Road 11, then connect to the Hybrid Alternative along the UPRR/SR 99 corridor, ending at Ranch Road. The San Jose to Fresno leg would continue eastward along SR 152 (North) south of Chowchilla and across the UPRR/SR 99 corridor, then curve south along the BNSF corridor to meet the Hybrid Alternative, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 (North) and Road 11 segments of this alternative (see Figure 2-2).

2.1.5 SR 152 (North) to Road 13 Wye Alternative

The SR 152 (North) to Road 13 Wye Alternative would essentially be the same as the SR 152 (North) to Road 11 Wye Alternative, except the San Jose to Merced leg would extend toward Merced along Road 13 rather than Road 11 to connect to the Hybrid Alternative along the UPRR/SR 99 corridor. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 and Road 13 segments of this alternative (see Figure 2-2).

2.1.6 SR 152 (North) to Road 18 Wye Alternative

The SR 152 (North) to Road 18 Wye Alternative would essentially be the same as the SR 152 (North) to Road 11 Wye Alternative from its western terminus at Carlucci Road to the Chowchilla area. From here, however, this alternative would continue further east along SR 152 south of Chowchilla. At about Road 16, the San Jose to Merced leg of this wye would curve northward across the UPRR/SR 99 corridor and extend north along Road 18, east of Chowchilla. It then would curve west along Potters Road, cross the SR 99 and UPRR on an aerial structure, then curve northward to follow the Hybrid Alternative along the UPRR/SR 99 corridor to Ranch Road. The San Jose to Fresno leg of this wye would continue east along SR 152, cross UPRR/SR 99, then curve south to the BNSF corridor, meet the Hybrid Alternative, and end at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 and Road 18 segments of this alternative (see Figure 2-2).

2.1.7 SR 152 (North) to Road 19 Wye Alternative

The SR 152 (North) to Road 19 Wye Alternative would essentially be the same as the SR 152 (North) to Road 18 Wye Alternative. However, east of Chowchilla and the UPRR/SR 99 corridor, the San Jose to Merced leg of this wye would extend along Road 19, rather than Road 18, to Potters Road. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 and Road 19 segments of this alternative (see Figure 2-2).

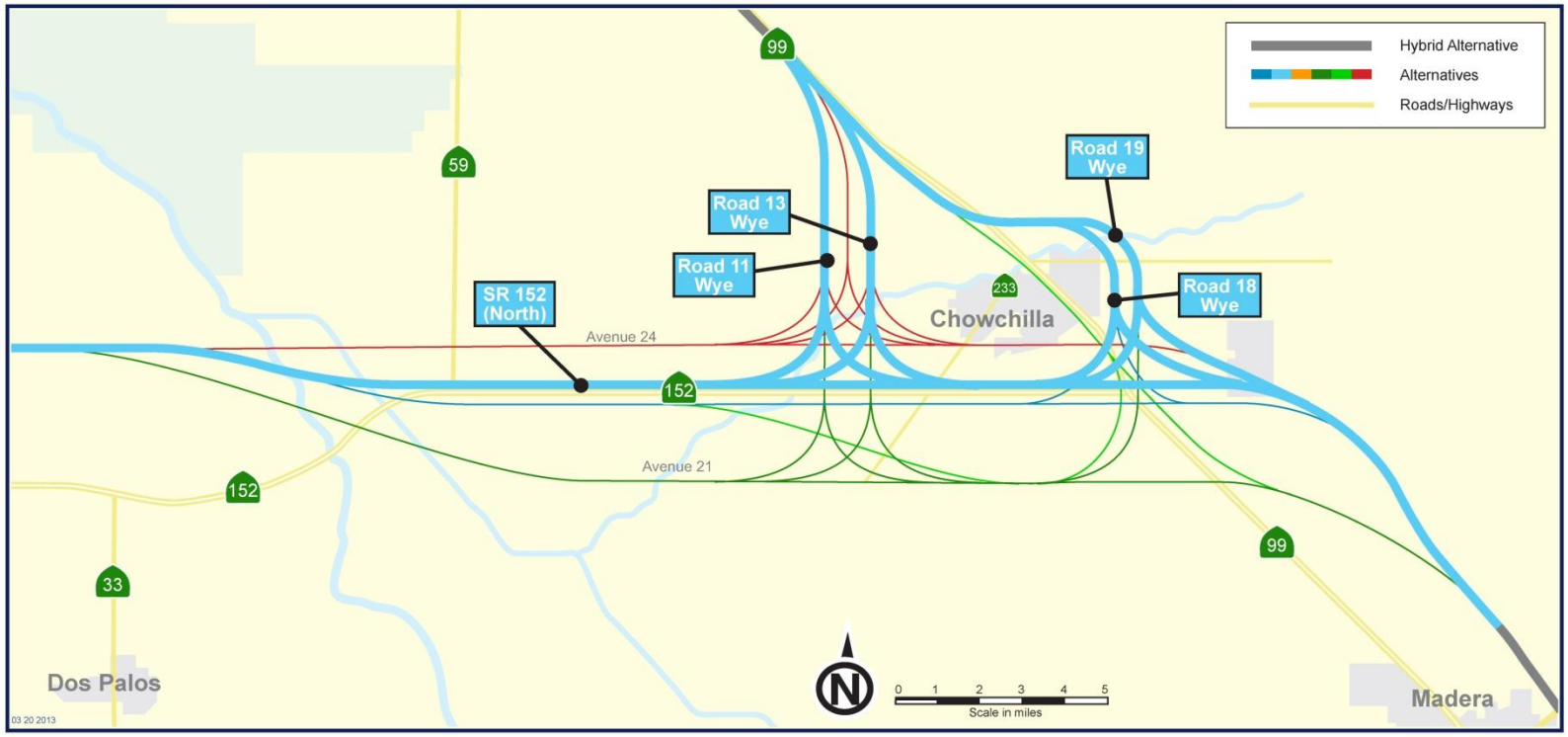


Figure 2-2
SR 152 (North) Wye Alternatives

2.1.8 SR 152 (South) to Road 18 Wye Alternative

The SR 152 (South) to Road 18 Wye Alternative would essentially be the same as the SR 152 (North) alternatives from Carlucci Road to Elgin Road, where it would turn south and run on a diagonal path toward the San Joaquin River. On its approach to the San Joaquin River and Eastside Bypass (flood control channel), this alternative would ascend gently to an aerial structure to cross the two watercourses, then turn east to align with SR 152, running on a tall embankment between the watercourses and the highway.

This alternative would enter the SR 152 corridor by crossing the SR 152/SR 59 interchange on an aerial structure then descend to grade, running from 500 to 700 feet south of SR 152. It would continue along SR 152 south of Chowchilla, where the San Jose to Merced leg of the wye would extend northward across the UPRR/SR 99 corridor and along Road 18, east of Chowchilla, then curve west along Potters Road. This alternative would rise to cross the UPRR/SR 99 corridor, curving northward to follow the Hybrid Alternative to Ranch Road. The San Jose to Fresno leg of the wye would continue east along SR 152, cross the UPRR/SR 99 corridor, then curve south along the BNSF to meet the Hybrid Alternative, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the SR 152 and Road 18 segments of this alternative (see Figure 2-3).

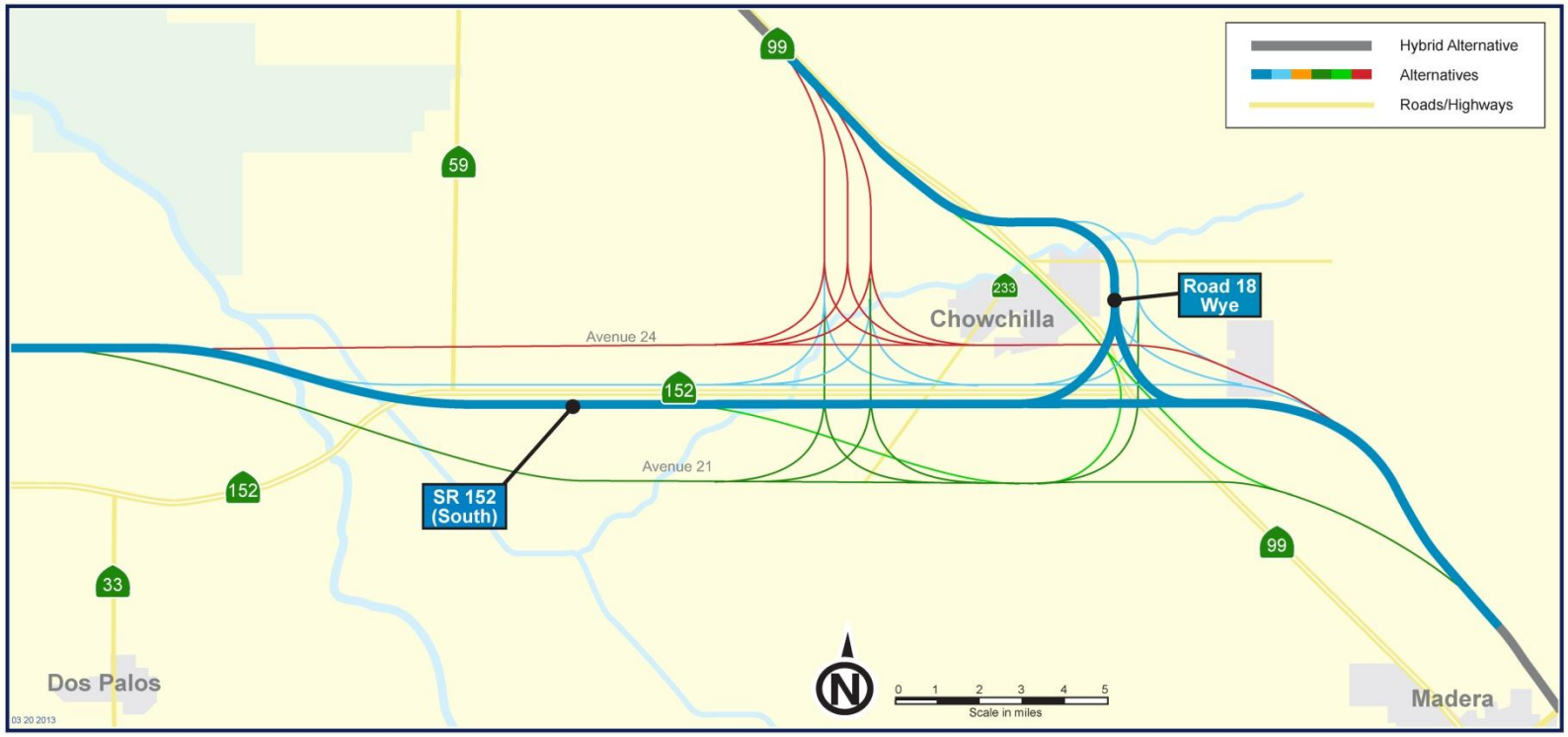


Figure 2-3
SR 152 (South) to Road 18 Wye Alternative

2.1.9 SR 152 (South) to Avenue 21 to SR 99 Wye Alternative

The SR 152 (South) to Avenue 21 to SR 99 Wye Alternative would essentially be the same as the SR 152 (North) alternatives from its western terminus at Carlucci Road to Juniper Road. At this point, it would turn south to run diagonally to reach Avenue 21 at about Road 15, south of Chowchilla. It would follow Avenue 21 to about Road 18, where the San Jose to Merced leg of the wye would turn north, curving on an aerial structure over SR 152, UPRR, and SR 99, continue north past Chowchilla, then pass over the UPRR/SR 99 corridor again and come to grade west of SR 99. It then would follow the Hybrid Alternative along the UPRR/SR 99 corridor to Ranch Road. The San Jose to Fresno leg of the wye would continue eastward along Avenue 21, cross the UPRR/SR 99 corridor, then curve southward to meet the Hybrid Alternative and continue south, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and SR 99 segments of this alternative (see Figure 2-4).

2.1.10 SR 152 (South) to Avenue 21 to Road 19 Wye Alternative

The SR 152 (South) to Avenue 21 to Road 19 Wye Alternative would be similar to the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative. With this alternative, however, the San Jose to Merced leg would extend further east of Chowchilla, curving on an aerial structure over the UPRR/SR 99 corridor, and continue north along Road 19. Then it would curve west along Potters Road to SR 99, rise to cross the UPRR/SR 99 corridor on an aerial structure, then follow the Hybrid Alternative to Ranch Road. The San Jose to Fresno leg of the wye would continue along Avenue 21 before curving to meet the Hybrid Alternative and BNSF corridor, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and Road 19 segments of this alternative (see Figure 2-4).

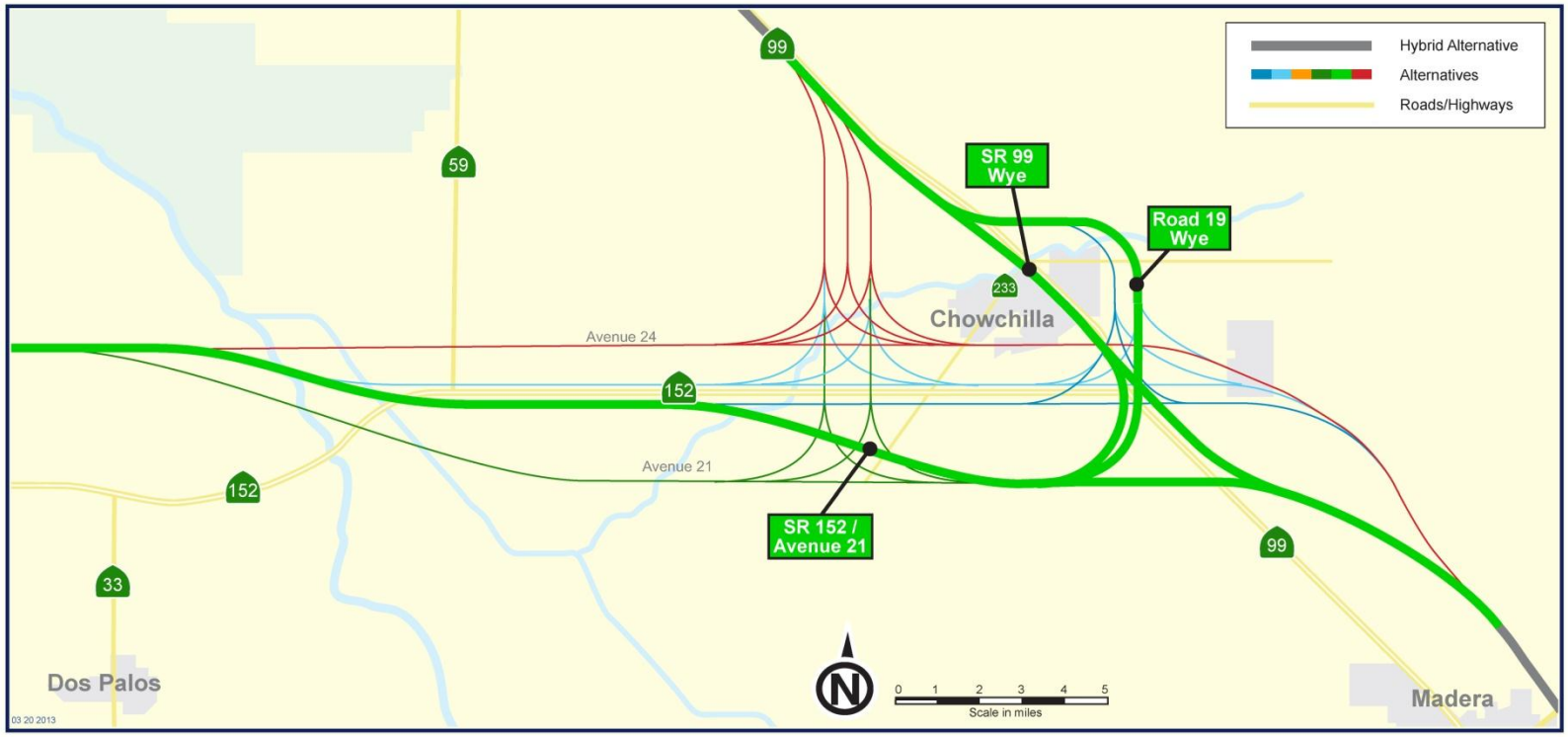


Figure 2-4
SR 152 (South) to Avenue 21 Wye Alternatives

2.1.11 Avenue 21 to Road 11 Wye Alternative

The Avenue 21 to Road 11 Wye Alternative would be the same as the SR 152 alternatives from its western terminus at Carlucci Road to Juniper Road. At Juniper Road, this alternative would turn south to run diagonally to Avenue 21, passing on aerial structure over the San Joaquin River and the Eastside Bypass channel. It would descend back to grade and curve to run east along the north side of Avenue 21. West of Chowchilla, at about Road 9, the San Jose to Merced leg of the wye would curve north, then follow Road 11 to the Hybrid Alternative, continuing to Ranch Road. The San Jose to Fresno leg of the wye would continue along Avenue 21, cross the UPRR/SR 99 corridor, then curve south to meet the Hybrid Alternative and BNSF corridor, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and Road 11 segments of this alternative (see Figure 2-5).

2.1.12 Avenue 21 to Road 13 Wye Alternative

The Avenue 21 to Road 13 Wye Alternative would be essentially the same as the Avenue 21 to Road 11 Wye Alternative except the San Jose to Merced leg of the wye would follow Road 13 toward Merced, rather than Road 11. The San Jose to Fresno leg of the wye also would be the same. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 21 and Road 13 segments of this alternative (see Figure 2-5).

2.1.13 Avenue 21 to SR 99 Wye Alternative

The Avenue 21 to SR 99 Wye Alternative would be similar to the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative. However, this alternative would curve south directly from Juniper Road to Avenue 21 in the vicinity of the San Joaquin River (see Figure 2-5).

2.1.14 Avenue 21 to Road 19 Wye Alternative

The Avenue 21 to Road 19 Wye Alternative would be essentially the same as the other Avenue 21 alternatives from its western terminus at Carlucci Road to south of Chowchilla. However, at about Road 15, the San Jose to Merced leg of this wye would curve northward onto an aerial structure over SR 152, UPRR, and SR 99, then return to grade along Road 19, extending north to Potters Road, then west to the Hybrid Alternative and north to Ranch Road. The San Jose to Fresno leg is the same as the other Avenue 21 alternatives as it extends to Madera Acres. The Merced to Fresno leg of this wye would provide the easterly connection between the Avenue 21 and Road 19 segments of this alternative (see Figure 2-5).

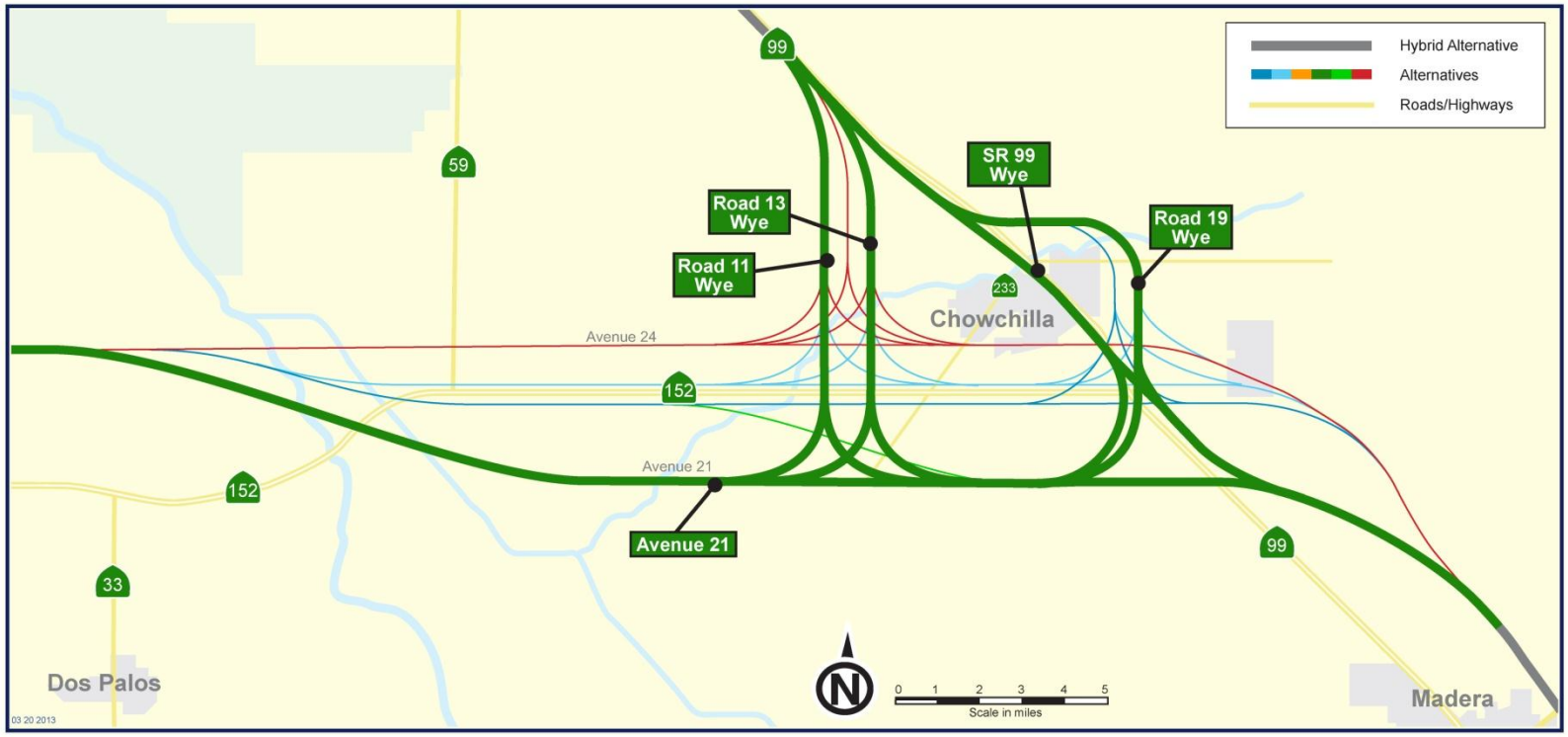


Figure 2-5
Avenue 21 Wye Alternatives

3.0 Evaluation of Wye Alternatives

Ten wye alternatives are recommended to be withdrawn from further analysis, and four are recommended to be carried forward for full study in the SEIR/SEIS, as described below and shown in Figure 3-1. A rationale for the recommendations to withdraw or carry forward the wye alternatives is provided below and shown in Appendix B.

3.1 Evaluation Criteria Used

Each wye alternative was evaluated based on a variety of criteria that include ability to meet project purpose and need/most project objectives, environmental impacts, and considerations of feasibility under NEPA and CEQA and practicability under Clean Water Act section 404 to determine which alternatives merit elimination and which merit carrying forward for detailed engineering design and environmental review in the SEIR/SEIS. An alternative may be eliminated from detailed study if it is not practicable under Clean Water Act section 404 and not potentially feasible under NEPA and CEQA. An alternative may also be eliminated from further study if it offers no substantial environmental advantage over alternatives recommended for study, particularly in the area of impacts to Waters of the United States.

The 14 wye alternatives considered in this SAA were evaluated based on criteria that include, but are not limited to, the criteria and examples listed below:

- Design objectives (such as travel time and cost)
- Land use (such as consistency with land use and general plans)
- Constructability (such as track type construction and access to the corridor)
- Community impacts (including relocation impacts)
- Natural resources (such as impacts on wetlands, potential threatened and endangered species habitat, cultural resources, Important Farmlands, and parks and recreational resources)
- Environmental quality (such as number of sensitive noise receptors)
- Additional considerations (such as ability to meet project purpose and support by public and agencies)

The listed screening criteria that most greatly affected the decision to eliminate or carry forward an alternative are listed below:

- Aquatic impacts – wetlands, vernal pools, etc.
- Environmental impacts - non-aquatic
- Practicability considerations -
    - Meeting the project purpose and need and design objectives
    - Feasibility of construction, considering logistics, cost and current technology

- Compatibility with land use plans and local community integrity
- Right-of-way acquisition issues and opportunities, used to determine whether an alternative could be constructed and at what cost in acquiring real estate

3.2 Stakeholder Involvement and Public Feedback

Throughout the alternatives analysis process to determine Central Valley Wye Alternatives, community outreach and stakeholder input have been essential aspects of the proceedings. Between November 2011 and March 2013, twenty-six public outreach meetings, briefings, presentations, workshops and webinars were held in the Wye alternatives study area. These are listed in Appendix C. In attendance were stakeholders, consisting of landowners, farmers, residents, organizations, public agencies and elected officials, who expressed opinions on the selection of a Wye alternative. These events were held in Chowchilla, Merced, Le Grand, Fairmead, and Madera. At these gatherings, stakeholders commented orally, and provided written information and questions on comment cards. The key themes specific to selection of Wye alternatives, as expressed by these stakeholders, are listed below:

Alignment along Existing Transportation Corridor

Stakeholders generally preferred a Wye alternative that follows existing transportation corridors to minimize agricultural and community impacts. A SR 152 alignment alternative was commonly cited as preferred.

Impacts to the City of Chowchilla

The Chowchilla area will be in the vicinity of the junction of the north-south Merced to Fresno Section and east-west San Jose to Merced Section via the Wye, and comments reflected the public's wish to minimize impacts to the area. The City of Chowchilla opposed a Wye area that would surround the city with high-speed rail track or an alignment that would divide the city east-west or north-south.

A Wye connection south and/or east of Chowchilla was generally preferred; the east of Chowchilla alternatives received mixed opinions; the west of Chowchilla alternatives were not received favorably.

Impacts to Agricultural Land

Stakeholders preferred an alternative that would not pass through valuable Central Valley farmland, if possible, because of its impact on the local and statewide agricultural economy.

The farming community expressed concern that road closures would limit agricultural goods movement and reduce access to agricultural properties.

The farming community expressed more support for the Avenue 21 Wye than the Avenue 24 Wye, expressing strong concerns about the Avenue 24 Wye. Some of these concerns included loss of usable farmland and the impact to farm operations and irrigation infrastructure, especially wells.

Some stakeholders supported Avenue 21 and SR 152 alignments as more viable options that would result in less loss of farmland and less parcel severance than other alignments.

Road Closures

School districts expressed concerns about road closures and potential impacts on school bus safety.

School districts also were concerned about increased costs associated with increases in travel distances and fuel consumption due to road closures.

Central Valley Wye Community Meetings

Central Valley Wye Community Meetings were held on March 20, 2013 in Fairmead and March 27, 2013 in Chowchilla, specifically to address the SAA. Stakeholders voiced a wide range of comments and questions at the meetings. These ranged from questions as to the cost of an HST trip from Merced or Fresno to San Francisco, to obtaining jobs, to requesting a roadway interchange at the SR 152/Road 16 intersection, independent of the HST project.

In addition, some common areas of interest were expressed, such as the effects of road closures on traffic and property access, and how the right-of-way process worked. Property owners voiced concerns about effects on land values and the relation and resulting effects of the various alignments on their own property, and there were related requests for maps showing the alternatives in detail. Many property owners had concerns regarding the potential impacts to agricultural land and operations in the region, and expressed an interest for the selection of an alignment which would minimize impacts to local residents, workers, and the community as a whole. Residents of Fairmead expressed concerns about impacts to their homes and to Fairmead Elementary School. Also, interest was expressed as to the potential impacts of alternatives on water wells and to water conveyance infrastructure, as well as potential noise concerns from passing trains.

Some stakeholders had questions about the alternatives evaluation process, such as how the number of alternatives was reduced from 14 to six to four, whether the four alternatives presented were the final ones, and if the public would have other opportunities to comment on the Wye selection. Also, some expressed concern that the Wyes work had originally been done as part of the Merced to Fresno EIR/EIS process and was being repeated, as part of the SEIR/SEIS process.

Many attendees expressed their preference for one of the alternatives over the others. There appeared to be support for the SR 152 to Road 18 Wye alternatives and opposition to the Avenue 21 to Road 13 alternative. The other Wye alternatives received a mix of support and opposition from those who expressed a preference.

3.3 Withdrawn Wye Alternatives – Rationale and Description

A rationale for the recommendations to withdraw the following 10 wye alternatives is provided below and shown in Appendix B, which presents information on all 14 wye alternatives side by side.

Avenue 24 to Road 11 Wye Alternative: The Avenue 24 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and

agricultural resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward. Further, the Avenue 24 to Road 11 Wye Alternative has opposition from the City of Chowchilla and rural farm interests.

Avenue 24 to East of Road 12 Wye Alternative: The Avenue 24 to East of Road 12 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and agricultural resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis. Further, the Avenue 24 to East of Road 12 Wye Alternative has opposition from the City of Chowchilla and rural farm interests.

Avenue 24 to Road 13 Wye Alternative: The Avenue 24 to Road 13 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and agricultural resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis. Further, the Avenue 24 to Road 13 Wye Alternative has opposition from the City of Chowchilla and rural farm interests.

SR 152 (North) to Road 11 Wye Alternative: The SR 152 (North) to Road 11 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic, agricultural and biological resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward.

SR 152 (North) to Road 19 Wye Alternative: The SR 152 (North) to Road 19 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and agricultural resources than the similarly aligned SR 152 (North) to Road 18 Wye Alternative, which is being carried forward. Additionally, this alternative would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, and this could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA).

SR 152 (South) to Avenue 21 to SR 99 Wye Alternative: The SR 152 (South) to Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward. This alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that resulted in one of the greatest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA).

Further, the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative has a capital cost of more than $7.2 billion, which is the second highest estimated capital cost of all the wye alternatives. The high cost of this wye alternative is due to this alignment requiring a greater amount of aerial structure than the other wye alternatives.

SR 152 (South) to Avenue 21 to Road 19 Wye Alternative: The SR 152 (South) to Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward. This alternative is also withdrawn because it does not

follow transportation corridors, leading to diagonal crossings that result in one of the greatest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA).

Avenue 21 to SR 99 Wye Alternative: The Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it has a capital cost of more than $7.3 billion which is the highest estimated capital cost of all the wye alternatives. Further, this is approximately $1.5 billion more than the Avenue 21 to Road 13 Wye Alternative, which is being carried forward and would result in lesser impact to aquatic resources. The additional cost of the Avenue 21 to SR 99 Wye Alternative is due to this alignment requiring a greater amount of aerial structure than the other wye alternatives.

Avenue 21 to Road 11 Wye Alternative: The Avenue 21 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic, agricultural and biological resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis.

Avenue 21 to Road 19 Wye Alternative: The Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic, agricultural and biological resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis. This alternative is also withdrawn because it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could have a negative impact the overall travel time requirement on the second leg of the HST (Sacramento to LA).

3.4 Carried Forward Wye Alternatives – Rationale and Description

Four wye alternatives are recommended to be carried forward for further analysis in the Merced to Fresno Section: Wye Alternatives SEIR/SEIS based on the criteria discussed in Section 3.1. Table 3-1 presents a summary of the evaluation data included in Appendix B: Wye Alternatives Evaluation Summary, which presents information on all 14 wye alternatives side by side. These wye alternatives have been determined to be potentially practicable and feasible, to fulfill the project's purpose and need and most project objectives, and to minimize environmental impacts.

The four wye alternatives that are recommended to be carried forward are shown in Figure 3-1. A description of these wye alternatives and the rationale for carrying them forward follows.

SR 152 (North) to Road 13 Wye Alternative: The SR 152 (North) to Road 11 Wye Alternative is carried forward for further analysis because it would have the least impact to aquatic and agricultural resources among all wye alternatives.

SR 152 (North) to Road 18 Wye Alternative: The SR 152 (North) to Road 18 Wye Alternative is carried forward for further analysis because it would result in the second least impact to aquatic resources among the SR 152 (North) wye alternatives and the fourth least

impact among all wye alternatives. Further, an SR 152 (North) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies.

SR 152 (South) to Road 18 Wye Alternative: The SR 152 (South) to Road 18 Wye Alternative is carried forward for further analysis because it has the second least impact to aquatic resources among all wye alternatives. Further, a SR 152 (South) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies.

Avenue 21 to Road 13 Wye Alternative: The Avenue 21 to Road 13 Wye Alternative is carried forward for further analysis because it has the third least impact to aquatic resources among all wye alternatives.

Table 3-1: Merced to Fresno Section Wye Alternatives Carried Forward Evaluation Summary

	SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 18 Wye	SR 152 (South) to Road 18 Wye	Avenue 21 to Road 13 Wye
Aquatic Resources (Acres)				
Wetland Habitat, Vernal Pool Complex, Lakes/Ponds/Rivers, Reservoir, Swamp/Marshes	118.1	121.5	118.7	119.2
Streams, Creeks, or Canals (Miles)	20.0	24.9	21.6	22.3
Biological Resources (Acres)				
San Joaquin Kit Fox, California Tiger Salamander, California Red-legged Frog, Vernal Pool Tadpole Shrimp, Vernal Pool Fairy Shrimp	5,607	6,253	6,197	5,535
Agricultural Lands (Acres of Important Farmland)				
Farmland of Local Importance, Prime Farmland, Unique Farmland, Farmland of Statewide Importance	2,514	2,834	3,231	2,823
Williamson Act Farmland (Acres)	1,204	1,123	1,286	1,192
Noise/Vibration (Number of Potentially Impacted Receptors Before Mitigation)	1,321/269	888/207	1,034/100	1,279/232
Grade Separations	21	22	20	23
Number of Schools within 1,500 feet	1	1	1 – School Displaced	2

Table 3-1: Merced to Fresno Section Wye Alternatives Carried Forward Evaluation Summary

	SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 18 Wye	SR 152 (South) to Road 18 Wye	Avenue 21 to Road 13 Wye
Residential and Business Relocations	142-163 Residences 5-10 Businesses	137-160 Residences 7-15 Businesses	132-155 Residences 9-16 Businesses	128-142 Residences 2-3 Businesses
Capital Costs M-F Wye Leg – Ranch Road to Avenue 17 (Millions)[1]	$1,010.2	$1,137.6	$1,142.9	$1,043.0
Capital Costs (Millions)[2]	$6,250	$6,723	$6,840	$5,836

[1] This cost includes only the north-south portion of the wye from Ranch Road to Avenue 17. Therefore it does not reflect the cost of the complete wyes, but only the portions necessary to travel between Merced and Fresno.

[2] This is the capital cost to build all three legs of the wye, from the endpoints of Carlucci Road, to Ranch Road, to Avenue 17.

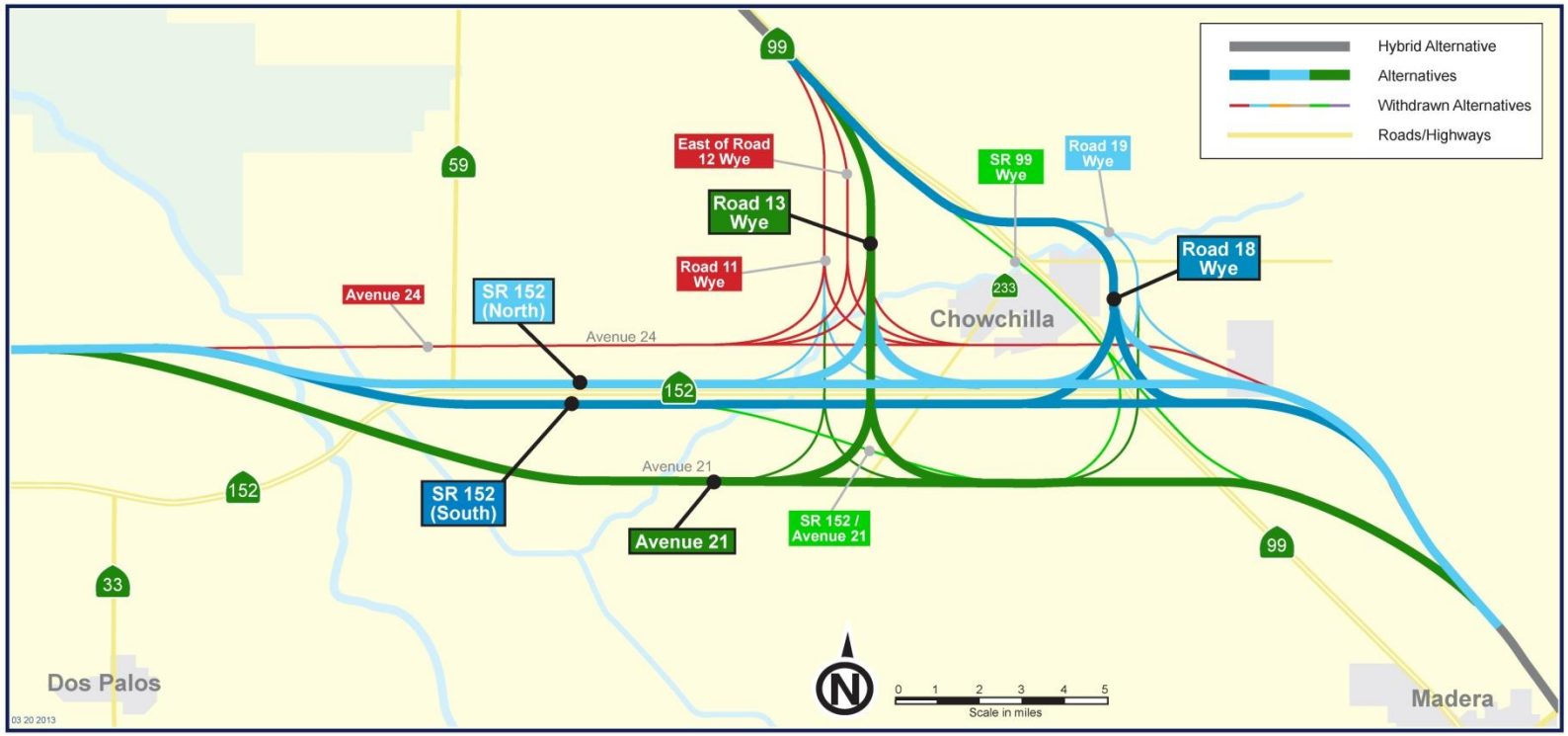


Figure 3-1
Wye Alternatives Withdrawn and Carried Forward

4.0 Recommendations

It is recommended that the four (4) alignment and wye configurations identified above and shown on Figure 4-1 be carried forward and evaluated in the Merced to Fresno Section: Wye Alternatives SEIR/SEIS. The SAA recommendations are summarized in Table 4-1: Merced to Fresno Section Wye Alternatives Considered.

This recommendation is subject to the regulatory review and concurrence by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, pursuant to the NEPA/Clean Water Action Section 404 Integration Memorandum of Understanding. Staff will report back to the Board if these agencies' views differ from this recommendation.

Table 4-1: Merced to Fresno Section Wye Alternatives Considered

WYE ALTERNATIVES	DECISION		REASONS FOR ELIMINATION*							ENVIRONMENTAL/OTHER CONCERNS
	Carried Forward	Withdrawn	Construction/Cost	Incompatibility	Right-of-way	Connectivity/ Accessibility	Revenue/Ridership	Traffic Circulation/	Environment	
Avenue 24 to Road 11 Wye		X		S					P	Aquatic resources; Agricultural resources; Opposition from City of Chowchilla and rural farm interests
Avenue 24 to East of Road 12 Wye		X		S					P	Aquatic resources; Agricultural resources; Opposition from City of Chowchilla and rural farm interests
Avenue 24 to Road 13 Wye		X		S				S	P	Aquatic resources; Agricultural resources; Circulation impacts due to number of road closures; Opposition from City of Chowchilla and rural farm interests
SR 152 (North) to Road 11 Wye		X							P	Aquatic resources; Agricultural resources; Biological resources; Noise impacts
SR 152 (North) to Road 13 Wye	X									Noise impacts
SR 152 (North) to Road 18 Wye	X									Capital cost; Cultural resources
SR 152 (North) to Road 19 Wye		X							P	Aquatic resources; Agricultural resources; Journey time
SR 152 (South) to Road 18 Wye	X									Fairmead Elementary School relocation; Agricultural resources
SR 152 (South) to Avenue 21 to SR 99 Wye		X	S						P	Aquatic resources; Agricultural resources; High capital costs; Journey time
SR 152 (South) to Avenue 21 to Road 19 Wye		X							P	Aquatic resources; Agricultural resources; Journey time
Avenue 21 to Road 11 Wye		X						S	P	Aquatic resources; Agricultural resources; Biological resources; Circulation impacts due to number of road closures
Avenue 21 to Road 13 Wye	X									Circulation impacts due to number of road closures
Avenue 21 to SR 99 Wye		X	P					S		High capital costs; Circulation impacts due to number of road closures
Avenue 21 to Road 19 Wye		X						S	P	Aquatic resources; Agricultural resources; Biological resources; Journey time; Circulation impacts due to number of road closures

Notes: * Primary (P) and secondary (S) reasons for elimination.

Figure 4-1
Merced to Fresno Section: Wye Alternatives Carried Forward

APPENDIX A
WYE ALTERNATIVES PREVIOUSLY WITHDRAWN

A total of seventeen "wye" alternatives have been evaluated in the alternatives analysis processes for the Merced to Fresno Section and San Jose to Merced Section of the California High-Speed Train (HST) project. Three of the 17 alternatives considered by the Board in the early phases of the alternatives analysis process were withdrawn from further consideration prior to this Supplemental Alternatives Analysis Report for reasons of environmental impacts, cost, and inconsistency with Proposition 1A. The three withdrawn alternatives are the State Route (SR) 140 Wye Alternative, Avenue 22 Wye Alternative, and South of Grasslands Ecological Area (GEA) Wye Alternative[9].

Several alternatives analyses have been prepared for the Merced to Fresno and San Jose to Merced sections of the HST with information pertinent to the 17 wye alternatives. However, no alternatives analysis had been prepared with a comprehensive analysis of all wye alternatives, due to the shifting of responsibilities for the alternatives between sections (Merced to Fresno, San Jose to Merced), revisions to alignment design over time, and shifts in the geographic extent of the analyses over time. Therefore, at the request of the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA), to provide a comprehensive and equal analysis of all 17 alternatives, the three withdrawn alternatives will be brought into the regulatory agencies' evaluation of Wye alternatives in the following documentation: Merced to Fresno Section: Wye Alternatives Supplemental Checkpoint B (March 2013) and San Jose to Merced Section Checkpoint B (March 2013). As described below, the three withdrawn alternatives also were included and evaluated in the San Jose to Merced Preliminary Alternatives Analysis Report (June 2010); Merced to Fresno Checkpoint B (April 2011). Two of the alternatives (SR 140 Wye Alternative and South of GEA Wye Alternative) were included and evaluated in Merced to Fresno Checkpoint B (April 2011).

The nomenclature for the alternatives has changed over time and, based on the decision to consider them separately based on their function to connect the east-west and north-south HST project alignments, were designated specifically as "wye" alternatives. The evaluation process for the three previously considered and withdrawn wye alternatives and the alternative alignments are described below and shown in Figures A-1, A-2 and A-3. Table A-1 summarizes the evaluation for the wye alternatives previously withdrawn.

SR 140 Wye Alternative

Background. The SR 140 Wye Alternative evolved from the early HST design and planning stages where it was referred to as the SR 140 Alignment Alternative. While the alignment generally followed SR 140, the specific route and design changed over time. Initially, the general alignment was the preferred program alignment identified during the 2005 Statewide planning process.

[9] See Authority Board presentation, dated June 3, 2010, posted on the Authority's website at: http://www.cahighspeedrail.ca.gov/Lib_San_Jose_Merced.aspx.

In the *2008 Bay Area to Central Valley Program EIR/EIS*, the SR 140 Alignment Alternative was identified as the "Caltrain/Pacheco/Grassland Ecological Area (GEA) North/Merced" alignment, and the EIR/EIS identified the Henry Miller Avenue network alternative as the preferred program alignment. However, the SR 140 alternative was recommended for continued evaluation and was evaluated in the June 2010 *Preliminary Alternatives Analysis Report: San Jose to Merced Section High-Speed Train EIR/EIS*. That analysis found the alignment to be inconsistent with Proposition 1A and to not meet the project's purpose and need due to its extended travel time. In addition, it had substantial impacts to residential areas, particularly in its approach to Merced and Atwater. Due to these considerations, the SR 140 Alignment Alternative was withdrawn from further consideration in 2010. In the 2013 Checkpoint B analysis, the SR 140 Wye Alternative was withdrawn for its substantial aquatic impacts and inconsistency with Proposition 1A.

The SR 140 Wye Alternative also was evaluated in the Merced to Fresno Section environmental process and was found to be impracticable based on considerations of logistics and cost.

Description. As shown in Figure A-1, the SR 140 Wye Alternative would begin in the Romero Creek Valley northeast of the San Luis Reservoir, approximately 5.5 miles west of Interstate
(I)-5. From this western terminus, the alternative would curve to the northeast and pass through a tunnel to emerge before crossing the California Aqueduct, then I-5, and lastly the Delta-Mendota Canal on an aerial structure. It would pass to the east of Gustine and meet SR 140, where it would run immediately west of the roadway. It would pass through a section of the GEA alongside SR 140, between the North Grasslands Wildlife Area and Great Valley Grasslands State Park. It would turn to the east at Fremont Ford State Recreation Area as it crosses the San Joaquin River, leaving SR 140. It would then arc north to cross SR 165 near 1st Avenue. It would return to SR 140 near Sultana Drive and cross the highway to follow immediately to the south of SR 140. At North Quinley Avenue, the SR 140 Wye Alternative would cross SR 140 to curve to the north and then south to meet the Merced to Fresno corridor at the Merced HST Station. Southbound, at Ranch Road north of Chowchilla, the SR 140 Wye Alternative would follow the Hybrid Alternative south through Chowchilla to Avenue 17 in Madera Acres, where it would end.

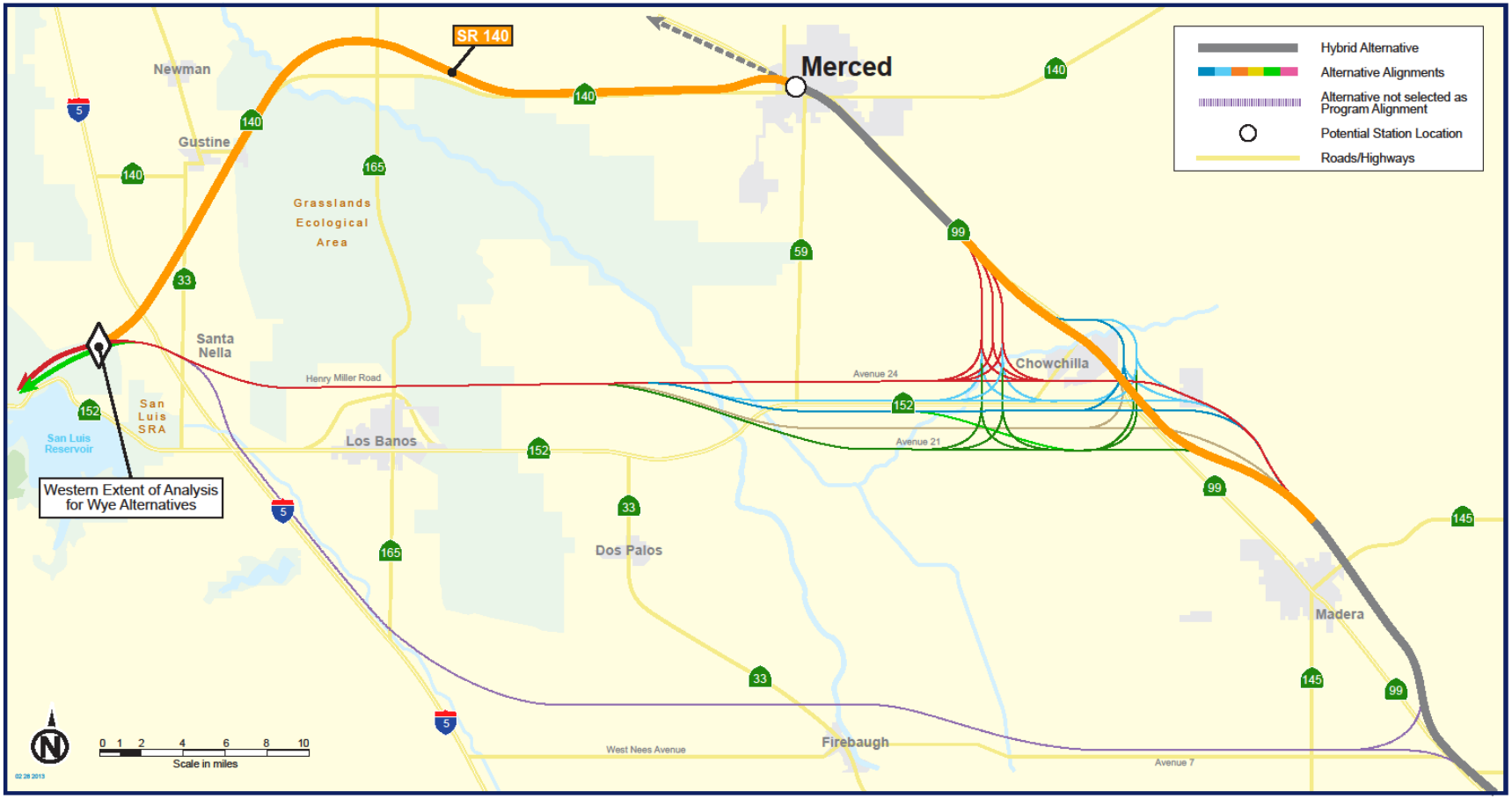


Figure A-1
SR 140 Wye Alternative

Avenue 22 Wye Alternative

Background. The Henry Miller Road to Avenue 22 Alignment Alternative was originally suggested by the City of Chowchilla, the City of Madera, and the Madera County Resource Management Agency and was developed in response to the City of Chowchilla's concern about impacts of a wye on the city. However, subsequent reviews of wye options showed that impacts would be even further reduced by use of an alternative along Avenue 21, as described in the *Alternatives Analysis Report for the Merced to Fresno Section High-Speed Train Project EIR/EIS*) (Merced to Fresno EIR/EIS). By bringing the east-west HST alignment south to Avenue 22, the junction with the Merced to Fresno HST Section would occur in the agricultural area south of Chowchilla and, therefore, would reduce impacts on developed areas around the city. Potential impacts to sensitive biological habitat, parklands and cultural resources would be comparable to those of the Avenue 21 Alignment Alternative, but would potentially result in 10 to 15 more residential displacements than the Avenue 21 alternative. Due to the remaining impacts of the wye on the City of Chowchilla (See Merced to Fresno EIR/EIS), the August 2010 Merced to Fresno *Supplemental Alternatives Analysis Report* recommended the Avenue 22 Wye be withdrawn in favor of the Avenue 21 Alternative. In the June 2010 *Preliminary Alternatives Analysis Report: San Jose to Merced Section High-Speed Train EIR/EIS*, the Avenue 22 Alignment Alternative was withdrawn from further consideration.

Description. As shown in Figure A-2, the alignment for the Avenue 22 Wye Alternative begins at the east end of Henry Miller Road and turns south to cross agricultural lands. It passes the San Joaquin River and then ascends to an aerial structure to pass over SR 152 and the Eastside Bypass (flood control channel). It descends back to grade and curves to align with Avenue 22 through agricultural areas, with grade separations provided to carry some roads over the railway, providing access to each side. The San Jose to Merced leg of the wye curves north to cross the UPRR/SR 99 corridor on an aerial structure, then follows the Hybrid Alternative north and terminates at Ranch Road. The San Jose to Fresno leg of the wye curves south to meet the Hybrid Alternative/BNSF corridor, ending at Avenue 17 in Madera Acres. The Merced to Fresno leg of the wye would provide the easterly connection between the Avenue 22 and SR 99 segments of this alternative.

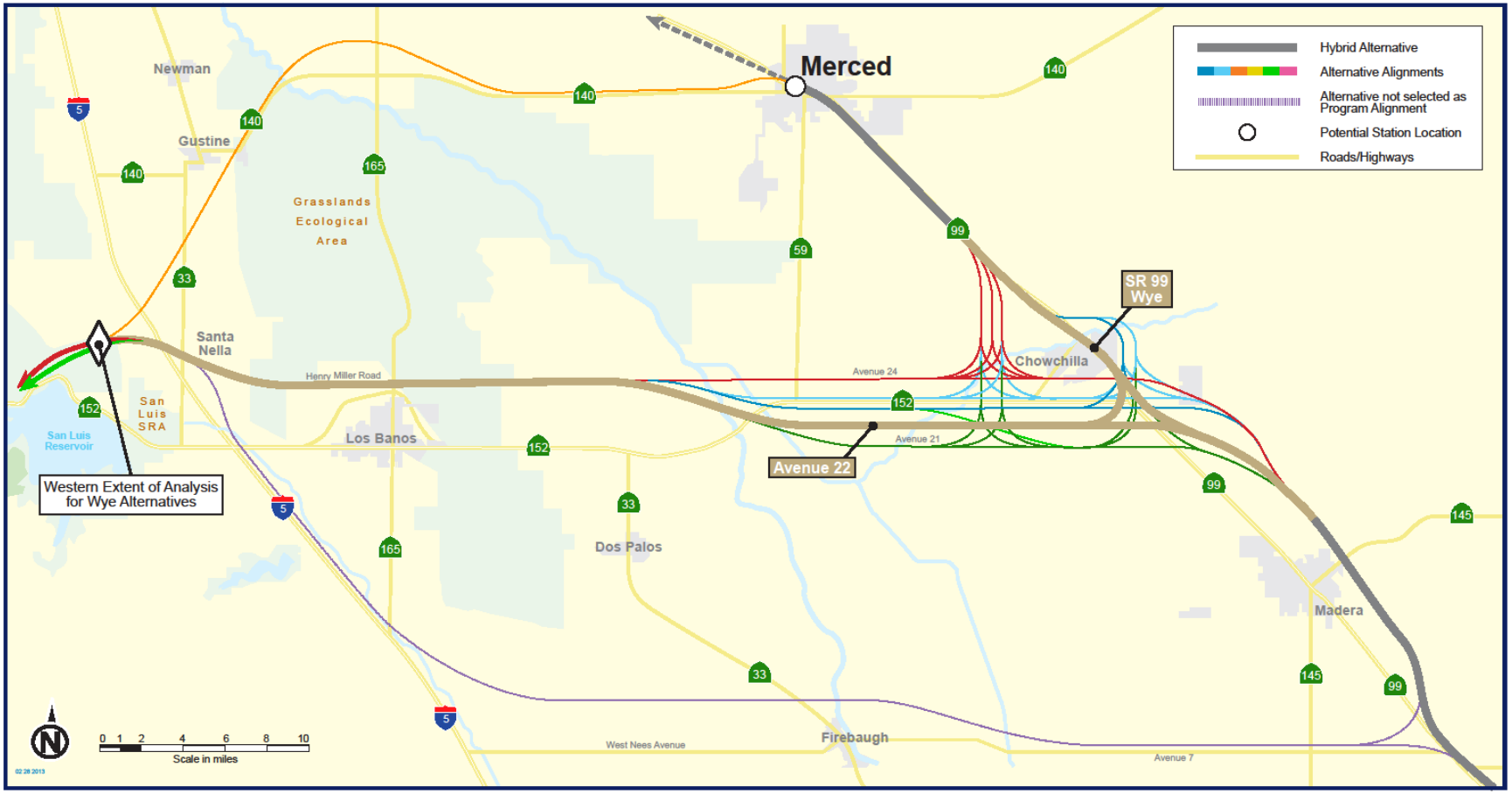


Figure A-2
Avenue 22 Wye Alternative

South of GEA Wye Alternative

Background. Through the *2008 Bay Area to Central Valley Program EIR/EIS* process, USACE and EPA concurred with the program-level determination that the Caltrain/Pacheco/Henry Miller Avenue and Caltrain/Pacheco/GEA North/Merced corridors most likely contained the LEDPA; these corridors did not include the South of GEA Wye Alternative. The South of GEA Wye Alternative was first identified in the 2010 Merced to Fresno *Preliminary Alternatives Analysis Report* as the "South Grasslands Ecological Area (SGEA)" connection. This connection, referred to in this document as the South of GEA Wye Alternative, also was included in subsequent documents: *San Jose to Merced Preliminary Alternatives Analysis* (June 2010) and *Merced to Fresno Checkpoint B* (April 2011). The South of GEA Wye Alternative was included in the March 2013 *Merced to Fresno Supplemental Checkpoint B* and *San Jose to Merced Checkpoint B* to confirm that this wye alternative did not represent the LEDPA.

Compared to the Program Alternative, the South of GEA Alignment Alternative would add 14 minutes of travel time between San Jose and Merced and an additional 20 miles, with associated environmental impacts and costs. It would be the most costly alternative, with a capital cost factor 2.1 times more than the least costly SR 140 alignment (which also was eliminated from further consideration). This alternative would potentially displace the second most residential units and, due to its length, would potentially impact the most acres of environmentally sensitive habitat, including habitat for California tiger salamander, San Joaquin kit fox, California red-legged frog, and vernal pool complexes. The South of GEA Alignment Alternative was withdrawn from further consideration in the June 2010 *San Jose to Merced Preliminary Alternatives Analysis Report* due to its substantial environmental impacts, residential displacements, and high costs.

Description. As shown in Figure A-3, the South of GEA Wye Alternative would extend eastward from its western terminus northeast of the San Luis Reservoir. It would then arc south to curve along the east side of I-5 near Henry Miller Road. It would remain parallel to I-5 until SR 165, where it would begin to curve east. It would run south of West Courtney Avenue through agricultural areas, with grade separations provided to carry some roads over the railway, providing access to each side. It would parallel the Delta-Mendota Canal, then ascend to cross over a UPRR branch line and SR 33. It would pass to the north of Firebaugh and cross the San Joaquin River, following the north side of Avenue 9. East of the river, it would curve to the south to run along the north side of Avenue 7. Near Road 25, a junction would provide a connection for Merced-bound trains that would arc to the north to meet the Merced to Fresno line just south of Madera. The primary leg of the South of GEA alternative would continue to follow the roadway all the way to SR 99, where it would arc south to meet the Merced to Fresno HST corridor at Herndon. The Merced to Fresno leg of the wye through Chowchilla would connect the HST along Road 7 to the Hybrid Alternative south of Madera.

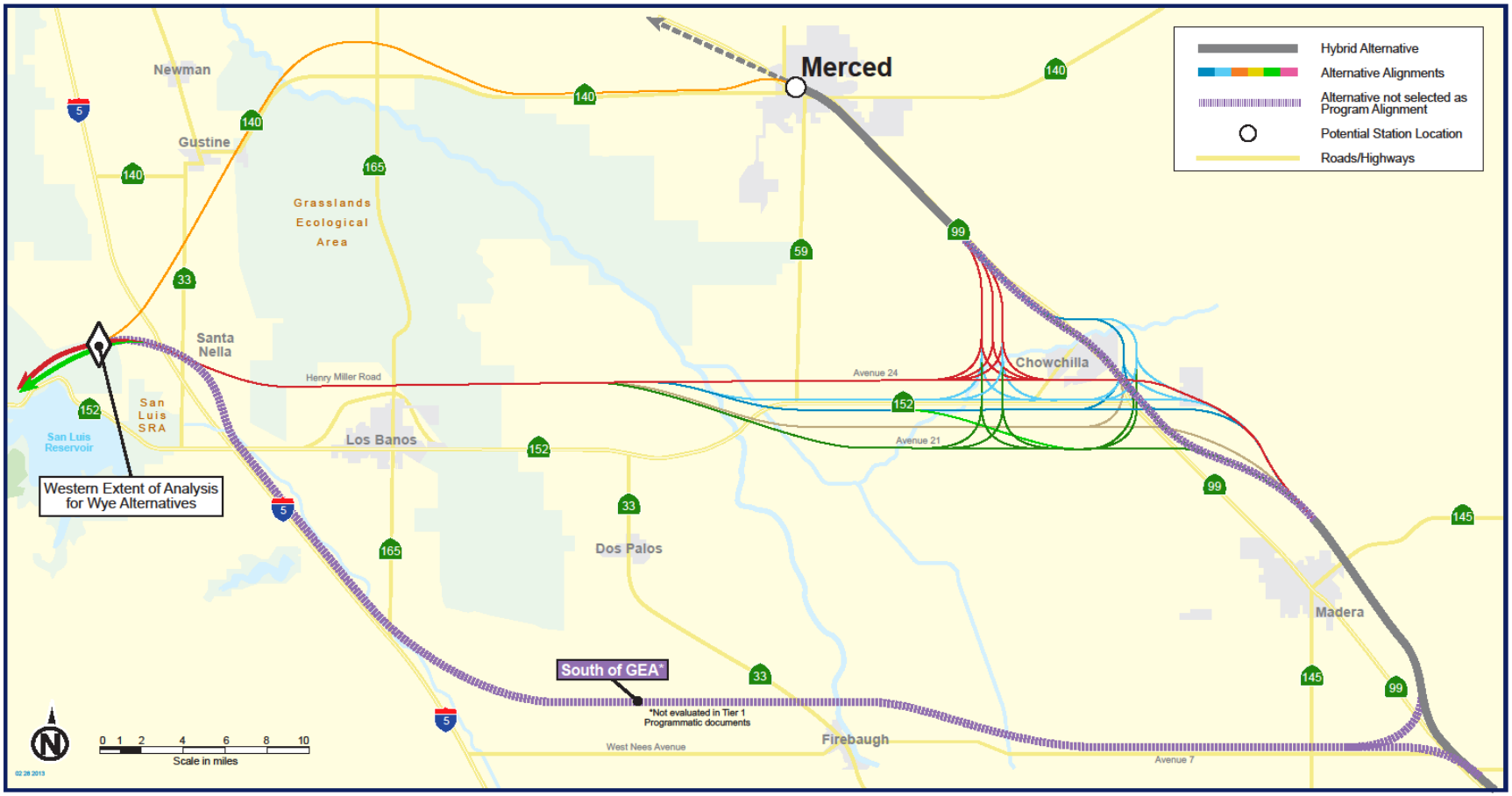


Figure A-3
South of GEA Wye Alternative

Table A-1: Evaluation Summary: Wye Alternatives Previously Withdrawn

Measurement	SR 140 Wye	Avenue 22 Wye	South of GEA Wye
Design Objectives			
Journey Time to Fresno (minutes)	28.17	23.20	23.00
Journey Time to Merced (minutes)	11.72	18.20	31.84
Journey Time Merced to Fresno (minutes)	16.45	16.90	16.45
Costs			
Operation and Maintenance Costs per Year (cost factor)	1.00	1.10	1.34
Capital Costs (cost in millions)	$5,276	$5,935	$7,103
Aquatic Resources			
Subtotal of Aquatic Resource Impacts (acres)	*173.1*	*181.0*	*245.4*
Wetland Habitat (acres)	33.5	50.5	35.7
Vernal Pool Complex (acres)	125.0	101.7	197.5
Streams, Creeks or Canals (miles)	8.1	22.9	20.4
Lakes/Ponds/ Rivers (acres)	5.3	8.4	4.7
Reservoir (acres)	6.7	16	7.5
Swamps/ Marshes (acres)	2.6	4.5	0.04

Measurement		SR 140 Wye	Avenue 22 Wye	South of GEA Wye
Constructability				
Constructability Issues Summarized		• Mostly conventional construction work • 2 mi bridge through environmentally sensitive area	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area	• Mostly conventional construction work
Disruption to Existing Railroads		3	3	4
Disruption to and Relocation of Utilities (miles)		• 0 sewer lines (≥16″) • 10 comm. Lines • 9 electrical lines (≥50kV)	• 0 sewer lines (≥16″) • 18 comm. lines • 13 electrical lines (≥50kV)	• 0 sewer lines (≥16″) • 10 comm. lines • 6 electrical lines (≥50kV)
Displacements				
Residential Displacement (single family, multi-family, mobile home parks) (parcels)		83 - 98	102 - 111	77 - 86
Business Displacement (commercial, industrial, non-profit) (parcels)		18 - 20	4 – 6	9 – 10
Environmental Resources				
Biological Resources (acres per species/ habitat)	California Wildlife Habitat Relationships (CWHR) Range Data	• 95 ac – California Red-legged Frog (CRLF) • 1,219 ac – San Joaquin Kit Fox (SJKF) • 2,168 ac – California Tiger Salamander (CTS)	• 399 ac – CRLF • 1,642 ac – SJKF • 3,517 ac – CTS	• 94 ac – CRLF • 2,024 ac – SJKF • 2,870 ac – CTS
	Critical Habitat	• 0.004 ac – Colusa grass • 0.004 ac – Hoover's spurge • 0.004 ac – Vernal pool tadpole shrimp • 0.004 ac – Vernal pool fairy shrimp • 0.004 ac – Conservancy fairy shrimp	None	None

Measurement		SR 140 Wye	Avenue 22 Wye	South of GEA Wye
Biological Resources (acres per species/ habitat)	California Natural Diversity Database (CNDDB)	• 62 ac - moestan blister beetle • 0.2 ac - CTS • 14 ac - giant garter snake • 5.9 ac - western pond turtle • 7.1 ac – succulent owl's clover • 14 ac – forked hare-leaf • 0.2 ac – California linderiella • 0.2 ac – western spadefoot • 14 ac – western mastiff bat • 10 ac – delta button-celery • 0.2 ac – San Joaquin kit fox • 1.7 ac – Yuma myotis • 0.2 ac – vernal pool tadpole shrimp • 3.7 ac - Cismontane Alkali Marsh • 13 ac – Swainson's hawk • 14 ac – round-leaved filaree • 18 ac - Sanford's arrowhead • 553 ac – longhorn fairy shrimp • 48 ac – tricolored blackbird	• 169 ac - moestan blister beetle • 371 ac - giant garter snake • 2.4 ac - western pond turtle • 8.9 ac - hispid bird's-beak • 21 ac – recurved larkspur • 126 ac - lesser saltscale • 21 ac – Hoover's cryptantha • 4.3 ac - American badger • 4.3 ac - northern harrier • 74 ac – subtle orache • 4.3 ac - Wright's trichocoronis • 16 ac - Swainson's hawk • 17 ac – succulent owl's clover • 1.7 ac - Yuma myotis • 40 ac - Cismontane Alkali Marsh • 157 ac - heartscale • 4.3 ac - Sanford's arrowhead • ac – longhorn fairy shrimp	• 1.6 ac – burrowing owl • 62 ac - moestan blister beetle • 8.0 ac - giant garter snake • 7.1 ac – succulent owl's clover • 0.1 ac – lesser saltscale • 32 ac – Nelson's antelope squirrel • 26 ac – blunt nosed-leopard lizard • 16 ac – Swainson's hawk • 1.6 ac – California horned lark • 3.1 ac – San Joaquin whipsnake • 63.5 ac – San Joaquin kit fox • 6.0 ac – giant kangaroo rat • 96 ac - prairie falcon • 1.8 ac - heartscale • 1.7 ac – Yuma myotis • 125 ac – Valley Sacaton Grassland
	Wildlife Refuges/ Conservation Areas	• 90 ac – GEA • 22 ac – North Grasslands Wildlife Area	• 244 ac – GEA	None
Cultural Resources (potential historical properties, known archaeological sites, archaeological sensitivity)		• 93 properties w/ buildings over 50 years old • 6 NRHP eligible or listed properties • 6 known archaeological sites	• 122 properties w/ buildings over 50 years old • 12 NRHP eligible or listed properties • 3 known archaeological sites	• 98 properties w/ buildings over 50 years old • 6 NRHP eligible or listed property • 5 known archaeological sites
Parklands		None	None	0.2 ac – Dos Amigos

Measurement	SR 140 Wye	Avenue 22 Wye	South of GEA Wye
Agricultural Land (acres)	• 139 ac – Farmland of Local Importance • 607 ac – Prime Farmland • 536 ac – Unique Farmland • 466 ac – Farmland of Statewide Importance	• 200 ac – Farmland of Local Importance • 967 ac – Prime Farmland • 912 ac – Unique Farmland • 588 ac – Farmland of Statewide Importance	• 241 ac – Farmland of Local Importance • 790 ac – Prime Farmland • 672 ac – Unique Farmland • 967 ac – Farmland of Statewide Importance
Williamson Act Farmland (acres)	760	1,217	1,512
Natural Environment			
Noise/Vibration (number of potential sensitive receptors)	1,137/236	1,015/202	1,051/153
Visual/Scenic Resources	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting
Geotechnical Constraints (known fault crossings, seismic zones, liquefaction zones)	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones
Land Use			
Consistency with Local Plans/ General Plans	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans.	Consistent with current plans.
School Districts			
Schools within 1500 feet of Alignment	2	2	0
Traffic			
Local Traffic Effects around Stations (increased congestion)	N/A	N/A	N/A
Road Closures	21	25	29
Grade Separations	21	26	23

<table>
<tr><th>Measurement</th><th>SR 140 Wye</th><th>Avenue 22 Wye</th><th>South of GEA Wye</th></tr>
<tr><td colspan="4">Agency and Public Input</td></tr>
<tr><td rowspan="2">Agency and Public Input</td><td colspan="2"></td><td>Numerous commenters opposed the West Chowchilla Bypass option, instead indicating a preference for a Wye connection south of Chowchilla.</td></tr>
<tr><td colspan="3">Farmers' Concerns
- Loss of Farmland
- Reduced access and connectivity
- Remnant Parcels
- Impacts on dairies
- Pesticide Buffer zone
- Bee activity/pollination
- Irrigation Systems
- Road closures resulting in reduced school bus safety and limited agricultural goods movement opportunities from the farms to local markets

Irrigation District Concerns
- Impacts on infrastructure
- Access for O&M
- Loss of revenue

Community Concerns
- Access across HSR alignment
- Impact on development
- Emergency Response
- Air quality
- Safety concerns due to fog
- Select alternative that would not pass through valuable Central Valley farmland if possible, because of its impact on the local and statewide agricultural economy
- High cost and lack of funding

School District Concerns
- Disruption of bus routes
- Loss of Revenue
- Noise & Vibration

Department of Corrections
- Security concerns
- Loss of Property
- Loss of Revenue</td></tr>
</table>

APPENDIX B
WYE ALTERNATIVES EVALUATION SUMMARY

Wye Alternative	Carried Forward or Withdrawn	Decision Explanation
Avenue 24 to Road 11 Wye	Withdrawn	The Avenue 24 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and agricultural resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward. Further, the Avenue 24 to Road 11 Wye Alternative has opposition from the City of Chowchilla and rural farm interests.
Avenue 24 to East of Road 12 Wye	Withdrawn	The Avenue 24 to East of Road 12 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and agricultural resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis. Further, the Avenue 24 to East of Road 12 Wye Alternative has opposition from the City of Chowchilla and rural farm interests.
Avenue 24 to Road 13 Wye	Withdrawn	The Avenue 24 to Road 13 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and agricultural resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward for further analysis. Further, the Avenue 24 to Road 13 Wye Alternative has opposition from the City of Chowchilla and rural farm interests.
SR 152 (North) to Road 11 Wye	Withdrawn	The SR 152 (North) to Road 11 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic, agricultural, and biological resources than the similarly aligned SR 152 (North) to Road 13 Wye Alternative, which is being carried forward.
SR 152 (North) to Road 13 Wye	Carried Forward	The SR 152 (North) to Road 13 Wye Alternative is carried forward for further analysis because it would have the least impact to aquatic and agricultural resources among all wye alternatives.
SR 152 (North) to Road 18 Wye	Carried Forward	The SR 152 (North) to Road 18 Wye Alternative is carried forward for further analysis because it would result in the second least impact to aquatic resources among the SR 152 (North) wye alternatives and the fourth least impact among all wye alternatives. Further, an SR 152 (North) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies.
SR 152 (North) to Road 19 Wye	Withdrawn	The SR 152 (North) to Road 19 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic and agricultural resources than the similarly aligned SR 152 (North) to Road 18 Wye Alternative, which is being carried forward. Additionally, this alternative would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, and this could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA).
SR 152 (South) to Road 18 Wye	Carried Forward	The SR 152 (South) to Road 18 Wye Alternative is carried forward for further analysis because it has the second least impact to aquatic resources among all wye alternatives. Further, an SR 152 (South) to Road 18 Wye Alternative has support from many stakeholders, members of the public, and agencies.
SR 152 (South) to Avenue 21 to SR 99 Wye	Withdrawn	The SR 152 (South) to Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward. This alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that result in one of the greatest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA). Further, the SR 152 (South) to Avenue 21 to SR 99 Wye Alternative has a capital cost of more than $7.2 billion, which is the second highest estimated capital cost of all the wye alternatives. The high cost of this wye alternative is due to this alignment requiring a greater amount of aerial structure than the other wye alternatives.
SR 152 (South) to Avenue 21 to Road 19 Wye	Withdrawn	The SR 152 (South) to Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward. This alternative is also withdrawn because it does not follow transportation corridors, leading to diagonal crossings that result in one of the greatest impacts to agricultural resources among the wye alternatives. Another reason for withdrawal is that it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA).
Avenue 21 to Road 11 Wye	Withdrawn	The Avenue 21 to Road 11 Wye Alternative is withdrawn from further analysis because it would result in a greater impact to aquatic, agricultural and biological resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis.
Avenue 21 to Road 13 Wye	Carried Forward	The Avenue 21 to Road 13 Wye Alternative is carried forward for further analysis because it has the third least impact to aquatic resources among all wye alternatives.
Avenue 21 to SR 99 Wye	Withdrawn	The Avenue 21 to SR 99 Wye Alternative is withdrawn from further analysis because it has a capital cost of more than $7.3 billion which is the highest estimated capital cost of all the wye alternatives. Further, this is approximately $1.5 billion more than the Avenue 21 to Road 13 Wye Alternative, which is being carried forward and would result in lesser impact to aquatic resources. The additional cost of the Avenue 21 to SR 99 Wye Alternative is due to this alignment requiring a greater amount of aerial structure than the other wye alternatives.
Avenue 21 to Road 19 Wye	Withdrawn	The Avenue 21 to Road 19 Wye Alternative is withdrawn from further analysis because it would result in more impacts to aquatic, agricultural and biological resources than the similarly aligned Avenue 21 to Road 13 Wye Alternative, which is being carried forward for further analysis. This alternative is also withdrawn because it would result in a longer journey time to Merced than the carried forward wye alternatives by approximately 0.5 to 4 minutes, which could negatively impact the overall travel time requirement on the second leg of the HST (Sacramento to LA).

Measurement	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
	Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Design Objectives														
Journey Time to Fresno (minutes)	23.35	23.35	23.35	23.33	23.33	23.33	23.33	23.63	23.37	23.37	23.40	23.40	23.44	23.40
Journey Time to Merced (minutes)	17.53	17.99	17.89	17.33	17.86	21.57	22.09	21.48	19.65	22.92	18.71	18.71	18.74	22.95
Journey Time Merced to Fresno (minutes)	16.23	16.80	16.22	16.61	16.29	17.61	17.59	16.99	15.09	18.16	16.78	16.78	15.09	18.16
Costs														
Operation and Maintenance Costs per Year (cost factor)	1.08	1.13	1.07	1.10	1.10	1.16	1.16	1.14	1.16	1.18	1.08	1.13	1.24	1.23
Capital Costs (cost in millions)	$5,830	$5,456	$5,233	$6,170	$6,250	$6,723	$6,705	$6,840	$7,193	$6,570	$5,530	$5,836	$7,338	$5,646
Aquatic Resources														
Subtotal of Aquatic Resource Impacts (acres)	*127.2*	*138.5*	*132.9*	*122.7*	*118.1*	*121.5*	*135.9*	*118.7*	*124.8*	*123.0*	*128.2*	*119.2*	*125.8*	*123.5*
Wetland Habitat (acres)	54.4	58.1	56.7	62.1	56.3	63.5	56.9	61.2	• 53.8	53.8	55.9	52.3	53.1	53.1
Vernal Pool Complex (acres)	48.2	48.6	49.9	40.4	41.0	41.1	42.5	41.1	40.7	43.2	40.5	41.1	40.7	43.2
Streams, Creeks or Canals (miles)	21.2	26.1	23.2	24.4	20.0	24.9	20.3	21.6	25.2	22.1	23.2	22.3	27.3	23.7
Lakes/Ponds/ Rivers (acres)	8.9	10.7	7.8	8.0	7.0	7.5	7.7	7.0	8.3	7.6	11.6	6.2	6.7	6.4

Measurement	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
	Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Reservoir (acres)	11.9	17.2	14.7	8.4	9.9	5.6	25.0	5.5	18.1	14.5	16.3	15.6	21.4	16.9
Swamps/ Marshes (acres)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	4.0	3.9	3.9	3.9	4.0
Constructability														
Constructability Issues Summarized	• Mostly conventional construction work • 1.5 mi bridge through environment-ally sensitive area	• Mostly conventional construction work • 1.5 mi bridge through environment-ally sensitive area	• Mostly conventional construction work • 1.5 mi bridge through environment-ally sensitive area	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area • Temporary impacts to 16 miles of SR 152 • Undercrossing of UPRR and SR 99 though Cut and cove r box tunnel	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area • Temporary impacts to 16 miles of SR 152 • Undercrossing of UPRR and SR 99 though Cut and cover box tunnel	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area • Temporary impacts to 16 miles of SR 152 • Undercrossing of UPRR and SR 99 through Cut and cover box • 2nd Cut and Cover box tunnel under crossing of UPRR and Future SR 99	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area Temporary impacts to 16 miles of SR 152 • Undercrossing of UPRR and SR 99 through Cut and cover box • 2nd Cut and Cover box tunnel under crossing of UPRR and Future SR 99	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area • Temporary impacts to 16 miles of SR 152 • Undercrossing of UPRR and SR 99 though Cut and cover box • 2nd Cut and Cover box tunnel under crossing of UPRR and Future SR 99	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area • Temporary impacts to 4 miles of SR 152	• Mostly conventional construction work • 1.5 mi bridge through environment-ally sensitive area • Temporary impacts to 4 miles of SR 152	• Mostly conventional construction work • 1.5 mi bridge through environment-ally sensitive area	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area	• Mostly conventional construction work • 1.5 mi bridge through environment-ally sensitive area	• Mostly conventional construction work • 1.5 mi bridge through environmentally sensitive area • Cut and Cover tunnel undercrossing of UPRR and Future SR 99
Disruption to Existing Railroads	3	3	3	3	3	4	4	4	4	4	3	3	4	5
Disruption to and Relocation of Utilities (miles)	• 1 sewer line (≥16″) • 10 comm. lines • 15 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 12 comm. lines • 16 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 12 comm. lines • 14 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 10 comm. lines • 14 electric lines (≥50kV)	• 1 sewer lines (≥16″) • 12 comm. lines • 14 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 19 comm. lines • 20 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 17 comm. lines • 17 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 19 comm. lines • 18 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 30 comm. lines • 14 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 19 comm. lines • 17 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 11 comm. lines • 17 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 13 comm. lines • 15 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 30 comm. lines • 14 electric lines (≥50kV)	• 0 sewer lines (≥16″) • 20 comm. lines • 18 electric lines (≥50kV)

Measurement		Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Displacements															
Residential Displacement (single-family, multi-family, mobile home parks) (parcels)		131 - 143	111 - 122	129 - 143	133 - 158	142 - 163	137 - 160	136 - 153	132 - 155	130 - 146	137 - 153	128 - 144	128 - 142	126 - 137	133 - 144
Business Displacement (commercial, industrial, non-profit) (parcels)		1 - 3	4 - 5	2 - 5	9 - 13	5 - 10	7 - 15	5 - 8	9 - 16	6 - 9	3 - 6	2 - 3	2 - 3	5 - 6	2 - 3
Environmental Resources															
Biological Resources (acres per species/ habitat)	California Wildlife Habitat Relation-ships (CWHR) Range Data	399 ac – CRLF) 1,755 ac – SJKF 3,476 ac – CTS	399 ac – CRLF 1,722 ac – SJKF 3,453 ac – CTS	399 ac – CRLF 1,693 ac – SJKF 3,618 ac – CTS	399 ac – CRLF 1,708 ac – SJFK 3,998 ac – CTS	399 ac – CRLF 1,561 ac – SJKF 3,647 ac – CTS	399 ac – CRLF 1,696 ac – SJKF 4,158 ac – CTS	399 ac – CRLF 1,567 ac – SJKF 4,027 ac – CTS	399 ac – CRLF 1,648 ac – SJKF 4,150 ac – CTS	399 ac – CRLF 1,578 ac – SJKF 3,300 ac – CTS	399 ac – CRLF 1,580 ac – SJKF 3,663 ac – CTS	399 ac – CRLF 1,603 ac – SJKF 3,753 ac – CTS	399 ac – CRLF 1,505 ac – SJKF 3,631 ac – CTS	399 ac – CRLF 1,569 ac – SJKF 3,374 ac – CTS	399 ac – CRLF 1,547 ac – SJKF 3,778 ac – CTS
	Critical Habitat	2.8 ac – Vernal pool tadpole shrimp 2.8 ac – Vernal pool fairy shrimp	None	None	2.8 ac – Vernal pool tadpole shrimp 2.8 ac – Vernal pool fairy shrimp	None	None	1.5 ac –Vernal pool tadpole shrimp 1.5 ac – San Joaquin Orcutt grass	None	None	0.1 ac – Vernal Pool Tadpole Shrimp 0.1 ac – San Joaquin Orcutt Grass	2.8 ac – Vernal pool tadpole shrimp 2.8 ac – Vernal pool fairy shrimp	None	None	1.5 ac – Vernal Pool Tadpole Shrimp 1.5 ac – San Joaquin Orcutt Grass

Measurement		Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
		Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Biological Resources (acres per species/ habitat)	California Natural Diversity Database (CNDDB)	127 ac - moestan blister beetle 442 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 15 ac - recurved larkspur 4.3 ac - lesser saltscale 15 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 4.3 ac - Wright's trichocoronis 12 ac - Swainson's hawk 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac - longhorn fairy shrimp	116 ac - moestan blister beetle 442 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 18 ac - recurved larkspur 4.3 ac - lesser saltscale 18 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 4.3 ac - Wright's trichocoronis 16 ac - Swainson's hawk 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac - longhorn fairy shrimp	161 ac - moestan blister beetle 442 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 9.6 ac - recurved larkspur 4.3 ac - lesser saltscale 9.6 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 0.6 ac - Yuma myotis 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac - longhorn fairy shrimp	124 ac - moestan blister beetle 437 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 229 ac - recurved larkspur 4.3 ac - lesser saltscale 229 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 21 ac - subtle orache 4.3 ac - Wright's trichocoronis 7.6 ac - Swainson's hawk 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac - longhorn fairy shrimp	129 ac - moestan blister beetle 422 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 194 ac - recurved larkspur 4.3 ac - lesser saltscale 194 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac - longhorn fairy shrimp	125 ac - moestan blister beetle 452 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 174 ac - recurved larkspur 4.3 ac - lesser saltscale 174 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 21 ac - subtle orache 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac - longhorn fairy shrimp	202 ac -moestan blister beetle .01 ac - CTS 422 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 181 ac - recurved larkspur 4.3 ac - lesser saltscale 181 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 1.0 ac - Yuma myotis 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac - longhorn fairy shrimp	125 ac - moestan blister beetle 445 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 231 ac - recurved larkspur 4.3 ac - lesser saltscale 231 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 1.5 ac – Yuma myotis 40 ac - Cismontane Alkali Marsh 35 ac - heartscale 4.3 ac - Sanford's arrowhead 261 ac – longhorn fairy shrimp	110 ac - moestan blister beetle 402 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 39 ac - recurved larkspur 158 ac - lesser saltscale 39 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 20 ac - subtle orache 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 4.7 ac - Yuma myotis 40 ac - Cismontane Alkali Marsh 167 ac - heartscale 4.3 ac - Sanford's arrowhead 261 ac – longhorn fairy shrimp	289 ac - moestan blister beetle .01 ac - CTS 437 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 40 ac - recurved larkspur 106 ac - lesser saltscale 40 ac - Hoover's cryptantha 4.3 ac - American badger 4.3 ac - northern harrier 22 ac – subtle orache 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 1.0 – Yuma myotis 40 ac - Cismontane Alkali Marsh 137 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac – longhorn fairy shrimp	161 ac - moestan blister beetle 420 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 100 ac - lesser saltscale 4.3 ac - American badger 4.3 ac - northern harrier 4.5 ac – subtle orache 4.3 ac - Wright's trichocoronis 11 ac - Swainson's hawk 40 ac - Cismontane Alkali Marsh 131 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac – longhorn fairy shrimp	161 ac - moestan blister beetle 420 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 201 ac - lesser saltscale 4.3 ac - American badger 4.3 ac - northern harrier 85 ac – subtle orache 4.3 ac - Wright's trichocoronis 18 ac - Swainson's hawk 40 ac - Cismontane Alkali Marsh 232 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac – longhorn fairy shrimp	110 ac - moestan blister beetle 409 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 139 ac - lesser saltscale 4.3 ac - American badger 4.3 ac - northern harrier 0.7 ac – subtle orache 4.3 ac - Wright's trichocoronis 16 ac - Swainson's hawk 4.7 ac - Yuma myotis 40 ac - Cismontane Alkali Marsh 147 ac - heartscale 4.3 ac - Sanford's arrowhead 261 ac – longhorn fairy shrimp	289 ac - moestan blister beetle .01 ac - CTS 420 ac - giant garter snake 2.4 ac - western pond turtle 8.9 ac - hispid bird's-beak 90 ac - lesser saltscale 4.3 ac - American badger 4.3 ac - northern harrier 0.7 ac – subtle orache 4.3 ac - Wright's trichocoronis 17 ac - Swainson's hawk 1.0 ac - Yuma myotis 40 ac - Cismontane Alkali Marsh 121 ac - heartscale 4.3 ac - Sanford's arrowhead 285 ac – longhorn fairy shrimp

Measurement	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
	Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Wildlife Refuges/ Conser-vation Areas	268 ac – Grassland Ecological Area (GEA)	268 ac – GEA	268 ac – GEA	268 ac – GEA	268 ac – GEA	268 ac – GEA	268 ac – GEA	243 ac – GEA	243 ac – GEA	244 ac – GEA	268 ac – GEA	268 ac – GEA	243 ac – GEA	268 ac – GEA
Cultural Resources (potential historical properties, known archaeological sites, archaeological sensitivity)	• 100 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 112 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • 1 known archaeo-logical site	• 106 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • 2 known archaeo-logical sites	• 159 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 153 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 168 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 151 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 148 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 129 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • 1 known archaeo-logical site	• 126 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 125 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeo-logical sites	• 141 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeological sites	• 127 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • 1 known archaeo-logical site	• 122 properties w/ buildings over 50 years old • 11 NRHP eligible or listed properties • No known archaeological sites
Parklands	None	None	None	None	None	None	0.5 ac – Berenda Reservoir	None	None	0.5 ac – Berenda Reservoir	None	None	None	0.5 ac – Berenda Reservoir
Agricultural Land (acres)[10]	• 197 ac – Farmland of Local Importance • 934 ac – Prime Farmland • 791 ac – Unique Farmland • 680 ac – Farmland of Statewide Importance	• 189 ac – Farmland of Local Importance • 971 ac – Prime Farmland • 771 ac – Unique Farmland • 682 ac – Farmland of Statewide Importance	• 225 ac – Farmland of Local Importance • 1,032 ac – Prime Farmland • 746 ac – Unique Farmland • 677 ac – Farmland of Statewide Importance	• 186 ac – Farmland of Local Importance • 1,133 ac – Prime Farmland • 736 ac – Unique Farmland • 778 ac – Farmland of Statewide Importance	• 182 ac – Farmland of Local Importance • 908 ac – Prime Farmland • 737 ac – Unique Farmland • 687 ac – Farmland of Statewide Importance	• 211 ac – Farmland of Local Importance • 1,147 ac – Prime Farmland • 899 ac – Unique Farmland • 577 ac – Farmland of Statewide Importance	• 194 ac – Farmland of Local Importance • 1,023 ac – Prime Farmland • 1,017 ac – Unique Farmland • 609 ac – Farmland of Statewide Importance	• 200 ac – Farmland of Local Importance • 1,244 ac – Prime Farmland • 1,014 ac – Unique Farmland • 773 ac – Farmland of Statewide Importance	• 187 ac – Farmland of Local Importance • 1,024 ac – Prime Farmland • 746 ac – Unique Farmland • 689 ac – Farmland of Statewide Importance	• 233 ac – Farmland of Local Importance • 1,155 ac – Prime Farmland • 960 ac – Unique Farmland • 672 ac – Farmland of Statewide Importance	• 256 ac – Farmland of Local Importance • 1,074 ac – Prime Farmland • 876 ac – Unique Farmland • 748 ac – Farmland of Statewide Import-ance	• 257 ac – Farmland of Local Importance • 1,058 ac – Prime Farmland • 748 ac – Unique Farmland • 760 ac – Farmland of Statewide Importance	• 187 ac – Farmland of Local Importance • 961 ac – Prime Farmland • 830 ac – Unique Farmland • 539 ac – Farmland of Statewide Importance	• 232 ac – Farmland of Local Importance • 1,092 ac – Prime Farmland • 1,085 ac – Unique Farmland • 517 ac – Farmland of Statewide Importance

[10] The SR 152 (North) to Road 18 Wye, SR 152 (North) to Road 19 Wye, SR 152 (South) to Road 18 Wye, Avenue 21 to Road 19 Wye, SR 152 (South) to Avenue 21 to SR 99 Wye, and SR 152 (South) to Avenue 21 to Road 19 Wye alignment alternatives would render large areas of farmland inaccessible and economically unusable because of the way in which farmland is boxed in between alternatives, and thus would result in a direct loss of that agricultural land. This area has been included in the total acreage of impacted agricultural land, including the conversion of Williamson Act farmland.

Measurement	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
	Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Williamson Act Farmland (acres)	1,148	1,070	1,073	1,191	1,024	1,123	1,353	1,286	1,147	1,492	1,303	1,192	1,030	1,399
Natural Environment														
Noise/Vibra-tion (number of potential sensitive receptors)	1,224/208	1,044/147	1,216/174	1,298/276	1,321/269	888/207	1,332/273	1,034/100	1,094/110	978/245	1,259/246	1,279/232	1,184/115	1,356/244
Visual/Scenic Resources	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	2.0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting	2.0 mi of aerial structure in urban setting	0 mi of aerial structure in urban setting
Geotechnical Constraints (known fault crossings, seismic zones, liquefaction zones)	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones	No crossings of seismic faults or fault rupture hazard zones; No liquefaction zones
Land Use														
Consistency with Local Plans/ General Plans	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans.	Consistent with current plans.	Consistent with current plans.	City of Chowchilla opposes SR 99 alignments within City limits. Crosses through City of Chowchilla's Site Annexation Plan area.	Consistent with current plans.
School Districts														
Schools within 1500 feet of Alignment	0	0	0	1	1	1	1	1	1	0	1	2	2	1

Measurement	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
	Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Traffic														
Local Traffic Effects around Stations (increased congestion)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Road Closures	21	31	40	32	32	33	32	33	31	32	41	40	41	42
Grade Separations	19	19	19	20	20	19	19	19	24	28	23	24	25	24

Measurement	Avenue 24			SR 152 (North)				SR 152 (South)	SR 152 (South) to Avenue 21		Avenue 21			
	Road 11 Wye	East of Road 12 Wye	Road 13 Wye	Road 11 Wye	Road 13 Wye	Road 18 Wye	Road 19 Wye	Road 18 Wye	SR 99 Wye	Road 19 Wye	Road 11 Wye	Road 13 Wye	SR 99 Wye	Road 19 Wye
Agency and Public Input														
Agency and Public Input	• There is more support for the Avenue 21 Wye over the Avenue 24 Wye from the farming community, which expressed strong concerns about the Avenue 24 Wye. Some of these concerns included loss of usable farmland and the impact to farm operations and irrigation infrastructure, especially wells. • The City of Chowchilla is strongly opposed to any Avenue 24 alignment. Rural interests generally favor a Road 11 or Road 13 alignment over an East of Road 12 alignment. • Rural interests generally favor a Road 11 or Road 13 alignment over an East of Road 12 alignment. • Madera and Merced County property owners noted their concern that the Authority was still considering routes that do not follow existing corridors, specifically, the A2/Hybrid Alternatives with the Avenue 24 Wye. The Refined Avenue 24 Wye connection is the same Wye that was used for the A3 route, which was not carried forward. A commenter stated that the Refined Avenue 24 Wye and West Chowchilla Bypass Option should not have been included in the Draft EIR/EIS for the Merced to Fresno Section. • Los Banos residents expressed support for the Henry Miller to Avenue 24 Alternative			• Certain communities expressed preferences that the Wye Alternatives should be selected from within the existing transportation corridor, specifically mentioning the I-5 corridor and SR 152 alternative as an appropriate alternative to address this concern. • SR 152 is generally preferred by most stakeholders over either Avenue 24 or Avenue 21. • The City of Chowchilla prefers routes which are farthest from the city (Road 11 and Road 19).							• There is more support for the Avenue 21 Wye over the Avenue 24 Wye from the farming community, which expressed strong concerns about the Avenue 24 Wye. Some of these concerns included loss of usable farmland and the impact to farm operations and irrigation infrastructure, especially wells.			
	Farmers' Concerns - Loss of Farmland - Reduced access and connectivity - Remnant Parcels - Impacts on dairies - Pesticide Buffer zone - Bee activity/pollination - Irrigation Systems - Road closures resulting in reduced school bus safety and limited agricultural goods movement opportunities from the farms to local markets			Irrigation District Concerns - Impacts on infrastructure - Access for O&M - Loss of revenue				Community Concerns - Access across HSR alignment - Impact on development - Emergency Response - Air quality - Safety concerns due to fog - Select alternative that would not pass through valuable Central Valley farmland if possible, because of its impact on the local and statewide agricultural economy - High cost and lack of funding			School District Concerns - Disruption of bus routes - Loss of Revenue - Noise & Vibration		Department of Corrections - Security concerns - Loss of Property - Loss of Revenue	

APPENDIX C
Public Outreach
Central Valley Wye Alternatives
November 2011 – March 2013

Date	Event/Organization	Location	Subject
11/29/2011	First meeting with Chowchilla and Alview-Dairyland School Districts	Chowchilla High School	Potential wyes impacts to school district properties.
1/9/2012	Joint San Jose to Merced / Merced to Fresno Stakeholder Meeting	Fairmead Church, Chowchilla	Current wye options as related to Merced to Fresno Hybrid alignment, transition wyes to San Jose to Merced team.
1/25/2012	Joint San Jose to Merced / Merced to Fresno Stakeholder Meeting	Chowchilla	Stakeholder meeting.
2/14/2012	Meeting with Merced County Supervisor Jerry O'Banion	Merced County Administration Building	Introduction to team, timetable, solicit ideas and suggestions pertinent to their stakeholders.
2/14/2012	Meeting with Merced County Supervisor Linn Davis	Merced County Administration Building	Introduction to team, timetable, solicit ideas and suggestions pertinent to their stakeholders
2/14/2012	Meeting with Merced County Supervisor John Pedrozo	Merced County Administration Building	Introduction to team, timetable, solicit ideas and suggestions pertinent to their stakeholders.
2/14/2012	Meeting with Merced County Supervisor Hubert Walsh	Merced County Administration Building	Introduction to team, timetable, solicit ideas and suggestions pertinent to their stakeholders.
2/15/2012	Meeting with Chowchilla Water District	Chowchilla Water District Offices	Provide overview of wye alternatives.
2/21/2012	Meeting with Merced County Board of Education	Merced County Office of Education	Potential effect of wye alternatives on school revenues.
2/22/12	Meeting with Plainsburg Elementary and Le Grand Union High school District	Plainsburg Elementary School, Le Grand	Potential effect of wyes alignments on school properties.
3/6/2012	Meeting with Madera and Chowchilla Officials	Chowchilla City Hall	General discussion of wye alternatives and hybrid alignment.
3/28/2012	Second meeting with Plainsburg Elementary and Le Grand Union High School Districts	Plainsburg Elementary School, Le Grand	Follow-up meeting to discuss the wye configurations.
4/18/2012	Second meeting with Chowchilla and Alview-Dairyland School Districts	Chowchilla High School	Potential wyes impacts to school district properties.
4/26/2012	TWG Quarterly Meeting	Webinar	Check in with agencies; provide project update. Include data for new wyes.

Date	Event/Organization	Location	Subject
6/20/2012	Meeting with Madera and Merced counties, Madera and Merced County Farm Bureaus, Madera and Merced County Planning, City of Chowchilla, City of Merced, landowners.	City of Chowchilla Council Chambers	Discuss wye alternatives.
8/15/2012	TWG quarterly meeting	Webinar	Wye updates.
3/14/2013	Meeting with Assemblyman Frank Bigelow, District 5	Sacramento	Discuss wye alternatives.
3/19/2013	City of Chowchilla	Chowchilla City Hall	Discuss the four carried forward wye alternatives.
3/19/2013	Madera County Farm Bureau	Farm Bureau office, Madera	Discuss the four carried forward wye alternatives.
3/19/2013	Merced County Farm Bureau	Farm Bureau office, Merced	Discuss the four carried forward wye alternatives.
3/19/2013	Executive Director, Merced County Association of Governments (MCAG)	MCAG offices Merced	Discuss the four carried forward wye alternatives.
3/20/2013	Central Valley Wye Community Meeting	Galilee Baptist Church, Fairmead	Community meeting to provide update and review the four carried forward alternatives for the Central Valley Wye.
3/20/2013	Lazy K Ranch	Ranch property, Chowchilla	Discuss the four carried forward wye alternatives and possible property mitigation potential.
3/21/2013	Executive Director, Madera County Transportation Commission (MCTC	MCTC office, Madera	Discuss the four carried forward wye alternatives.
3/26/2012	Congressional Wye alignment Tour	Merced and Madera counties	Tour of the wye alignments.
3/27/2012	Central Valley Wye Community Meeting	Chowchilla Fairgrounds	Community meeting to provide update and review the four carried forward alternatives for the Central Valley Wye.